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ORIGINAL ARTICLES.

CRIPPLED TUBERCULOUS CHILDREN:

A CONSIDERATION OF CERTAIN PRINCIPLES GOVERNING THE CORRECTION OF DEFORMITY IN TUBERCULOUS DISEASE OF THE SPINE AND THE HIP, AND ILLUSTRATED BY REFERENCES TO SELECTED CASES.[1]

(Article continued from January issue of this Journal.)

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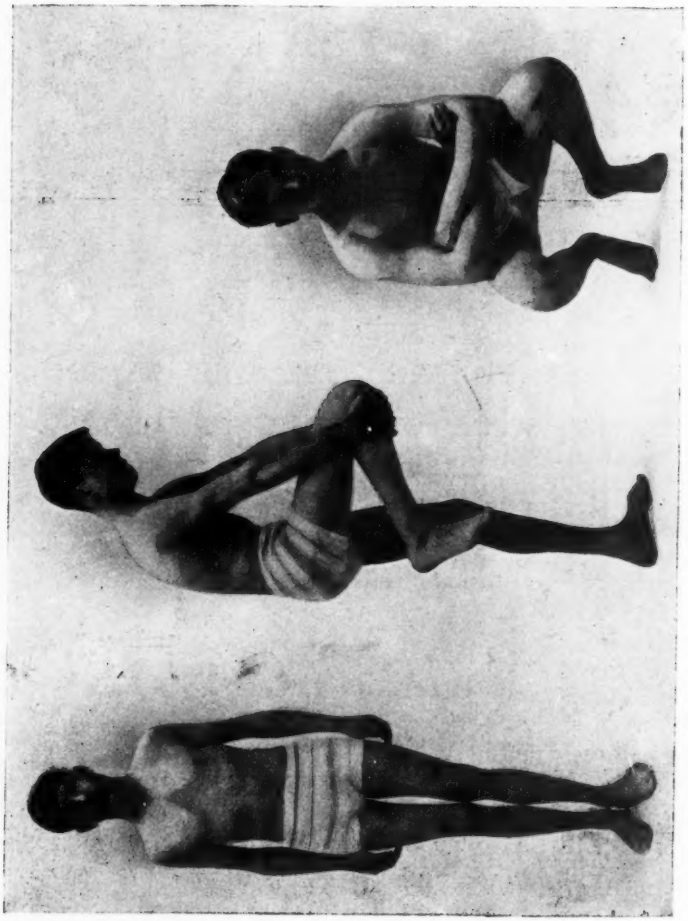
In the last number of this Journal I endeavoured to indicate the principles governing the correction of deformities occurring in tuberculous disease of the spine. Particulars and illustrations were given of various selected cases. In the present article I desire to continue that study by reference to certain selected cases of tuberculous disease of the hip-joint. As was previously emphasized, the orthopædic requirements of each case must always be individually studied, the reason for each divergence from the normal fully appreciated, and the deformity rectified by the application of methods of correction, not

[1] The illustrations accompanying this paper are reproductions from photographs taken by Mrs. H. J. Gauvain. They are reproduced from the "Report on the Medical Work of the Lord Mayor Treloar Cripples' Hospital, Alton, Hampshire," recently published by Messrs. Horace Marshall and Son, Temple House, Temple Avenue, London, E.C. Price 1s. net.

only in themselves mechanically sound, but also able to act effectively within those restricted limits which the presence of the causative and associated disease prescribes.



FIGS. 1, 2, 3.—A. W., ADMITTED TO HOSPITAL WITH ACUTE TUBERCULOUS DISEASE OF RIGHT HIP-JOINT.
Disease arrested, good movement has returned, patient now being trained in college.

General Principles in Tuberculosis of the Hip-Joint.

In acute cases of tuberculous disease of the hip-joint, correction of deformity should, where possible, be attempted concurrently with the endeavours to secure arrest of the disease. This is not always possible, and there are occasions where hip disease may be most speedily arrested

by neglecting immediate attempts at correction of deformity. Again, there are many cases where existing deformity may be corrected, but the disease still persists, and may, indeed, become more active.

In the majority of cases of active hip disease, where there is some deformity, but where there is not complete fixation of the joint, both correction of deformity and arrest of the disease may be most successfully attempted simultaneously by keeping the patient dorsally recumbent, immobile, and with the contracted muscles about the hip-joint stretched by extension applied to the affected limb. The position the limb should occupy may be ascertained by adopting the following rule: With the patient lying on his back on a firm horizontal mattress, the affected leg should be flexed until any existing lordosis has disappeared. The leg should then be placed in such a position that the two anterior superior iliac spines should be in the same horizontal plane, and the imaginary straight line joining them should be at right angles to the long axis of the trunk. The patient may best be kept in this position either by fixing the trunk with such a spinal jacket as described elsewhere,[1] or by applying a Liston long splint to the healthy side. Extension then applied to the affected femur, and in the direction in which the femur is now pointing, sufficient in degree to overcome the spasm about the affected hip-joint, will act effectively. The deformity may be gradually corrected by readjusting the direction of the pull, as the muscles causing the deformity are stretched and tired out. The position of choice which should be aimed at is one of abduction of the limb with slight inversion of the leg. That degree of abduction should be sought which will minimize or neutralize any shortening if an ankylosed hip-joint is anticipated. Slight inversion of the leg is desired to overcome the tendency to eversion which commonly exists, and because the patient has a less unsightly walk later and is also less exposed to danger than if he walks with an everted foot. Some surgeons are quite content if, as the ultimate result of treatment, they secure a hip-joint firmly ankylosed in a good position, and, indeed, it is frequently alleged that such a patient is safer than if a fair range of movement is obtained in the affected joint. This is not necessarily the case, and I do not regard the ultimate result of treatment as altogether satisfactory unless the disease is not only completely arrested, but also the patient has recovered a useful range of movement and is left with little appreciable deformity. The nearer the cripple child can approximate to the normal after treatment is completed, the better is the result of the treatment given.

Case I., Figs. 1, 2, 3, is a good example of successful treatment.

A. W., a boy aged ten years, was admitted to hospital on October 7, 1909, suffering from acute tuberculous disease of the right

[1] Gauvain, "The Mechanical Treatment of Spinal Caries," *Lancet*, March 4, 1911.

FIG. 4.

FIG. 5.

FIG. 6.

FIG. 7.

FIGS. 4–11.—DEFORMITY FOLLOWING TUBERCULOUS DISEASE OF THE RIGHT HIP-JOINT CORRECTED BY TENOTOMY AND EXTENSION.
A useful range of movement in the affected joint may be confidently anticipated.

FIG. 8.

FIG. 9.

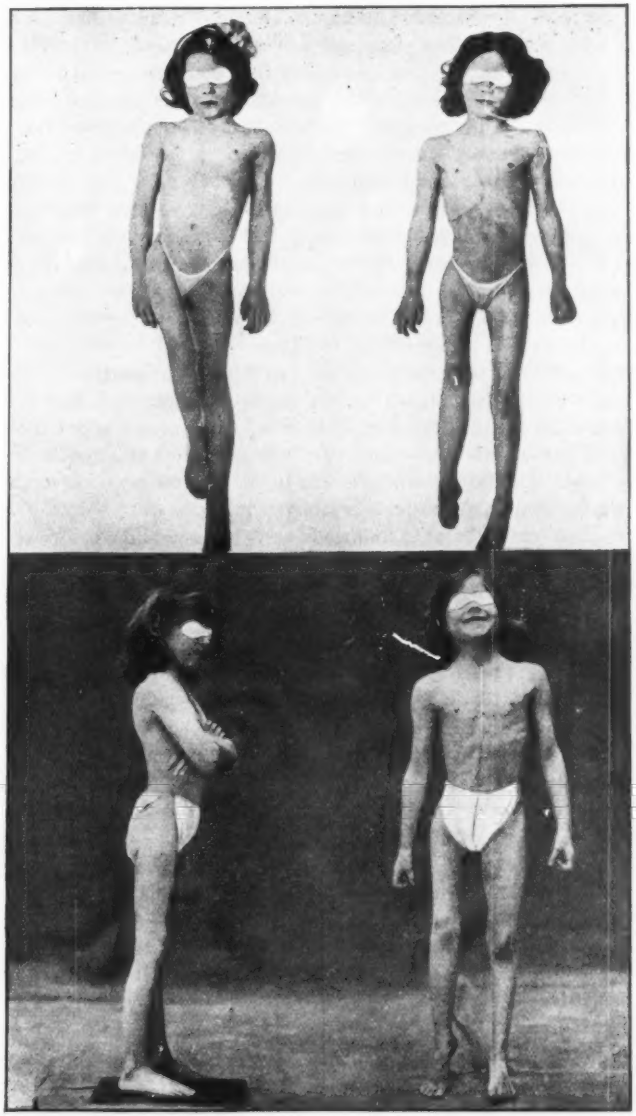


FIG. 10.

FIG. 11.

Fig. 4: D. S., Tilting of pelvis, with adduction. Fig. 5: D. S., Flexion and lordosis. Figs. 6 and 7: D. S., Deformity corrected, patient in short plaster spica. Fig. 8: D. S., Recumbent; note flexion and adduction. Fig. 9: D S., Recumbent; flexion and adduction corrected. Figs. 10 and 11: D. S., Erect; deformity corrected.

hip-joint, with flexion and abduction. He was discharged on May 11, 1911, with no deformity, and the disease apparently arrested. On leaving the hospital he was provided with a special celluloid splint, crutches, and a patten on the sound leg, and full directions for his after-care were given to his parents. He was kept under observation at our London Out-Patients' Department, and meanwhile attended school. He was admitted to our college on September 22, 1913, for special training in a trade. The college master now reports that he is making excellent progress at his trade (leather-bag-making). His general health is perfect, he is no longer a cripple, and he has almost complete movement in the affected hip-joint. He will leave the college with hardly any perceptible physical defect, and fitted for remunerative and congenial occupation as a skilled workman.

The period during which extension should be maintained is not measured by the time taken to get the leg straightened, but is best determined by the time taken to abolish muscular spasm about the hip-joint, and considerable experience is necessary before this period can be safely fixed. The return of movement in the affected joint is facilitated by keeping it immobilized for a prolonged period by the aid of a suitably applied plaster spica, followed later by a celluloid hip splint. These appliances are greatly to be preferred to such contrivances as the Thomas hip splint, by reason of their perfect fit, the much more efficient immobilization, and the ease with which associated deformities, such as eversion of the leg, may be prevented. During this period ambulatory treatment with crutches and patten is advocated. Alternatively, an ambulatory celluloid hip-splint with special boot may be used.

A healthy joint immobilized for a long time tends to become fixed; a tuberculous joint immobilized tends to become mobile. The lesion which was the result of the disease, and about which reactionary fibrous tissues formed as a barrier to its spread, subsides after fixation if all goes well. With its cure, the fibrous tissue, the formation of which it had provoked, likewise becomes absorbed. I have frequently noticed patients who have been discharged with hip-joints ankylosed by fibrous tissue recover excellent movement after one or two years' immobilization in a celluloid hip-splint. An aid to return of mobility is afforded by the employment of sun treatment as already described.[1]

CASE II.—*Tuberculous Disease of Both Hip-Joints.*—Tuberculous disease of both hip-joints presents grave difficulties in treatment, from an orthopædic point of view. In my experience the subjects of this condition are more commonly of the sandy or red-haired type (colloquially called "ginger"). They usually pigment, when exposed to the sun, with great difficulty or not at all, and in the latter case sun

[1] Gauvain and De Voss, "Heliotherapy in Surgical Tuberculosis," BRITISH JOURNAL OF TUBERCULOSIS, April, 1914.

treatment is of little value. Treated inefficiently, severe deformity of varying types results, the most troublesome being flexion with more or less adduction—the so-called "scissor leg." The best result is obtained by early treatment long continued. In these, if the initial deformity is corrected, prolonged extension combined with immobilization is advised, in the hope that ultimate good movement at the affected joint may be obtained. Such combined extension and immobilization is best secured by combining plaster extension with immobilization. A plaster stocking is applied from the toes to well above the femoral condyles, and extension webbing incorporated with this plaster. The plaster is well moulded about the condyles. When it has set, a piece of lint is wound around each plaster above the knee, and over this a further plaster is applied, which is continued in the form of a short double hip spica. After setting, the lint is removed, and it will now be found that the hips may be kept immobilized, with the legs extended in the position of selection. Deformity may in this way be completely guarded against, and in many cases some movement may eventually return. If ankylosis is anticipated from the outset, it is as well to allow one leg to partially flex, but in a slightly abducted position, or alternatively to make an artificial hip-joint when the disease is quiescent.

An example of how considerable deformity due to tuberculous disease of the hip-joint may be corrected without operation on the bone or joint is illustrated in Figs. 4-11.

Case III.—D. S., aged eight years, was admitted on January 14, 1915, suffering from old tuberculous disease of the right hip-joint, with considerable shortening as the result of the disease. The joint was apparently fixed, but the fixation was not bony, but fibrous. The X-ray photograph showed that much of the head and neck of the femur was destroyed and the socket of the joint disintegrated. The femur was displaced upwards. Fig. 5 shows the degree of flexion of the femur and lordosis of the spine. Fig. 4 shows the adduction and tilting of the pelvis. Fig. 8, taken from above with the patient recumbent, shows both the adduction and flexion of the femur. Tenotomy of the adductors was first performed, and extension to the affected limb carefully applied. In this way the leg was gradually but speedily straightened, as shown by Figs. 9 (recumbent), 10 and 11 (erect). A cast of the hip-joint was then taken for the purpose of manufacturing a celluloid hip splint, and while that was being made the joint was immobilized in a short plaster spica (Figs. 6 and 7). The patient was then allowed up with crutches. Meanwhile a considerable degree of mobility had returned in the affected joint. The child was discharged with a celluloid splint, and provided with a high boot to compensate for the shortening. The splint will be worn for about a year, and at the

FIG. 12

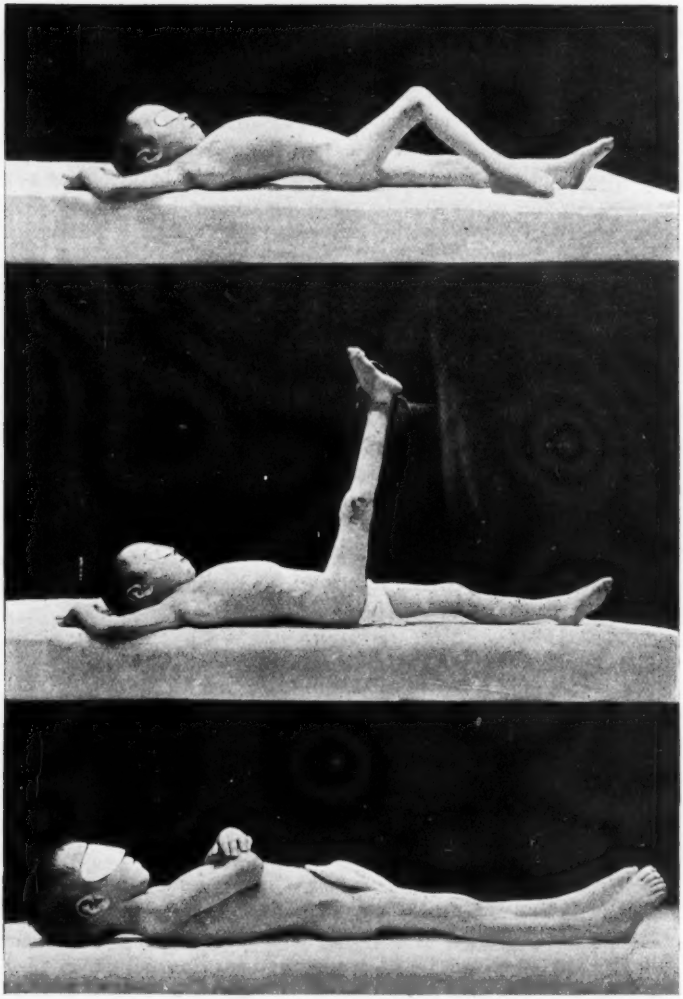


FIG. 13.

FIG. 14.

FIGS. 12–19.—FIXED DEFORMITY FOLLOWING TUBERCULOUS DISEASE OF THE RIGHT HIP-JOINT CORRECTED BY SUBTROCHANTERIC OSTEOTOMY.

The affected hip will remain stiff, but the leg is now in a useful and safe position.

FIG. 15.

FIG. 16.

FIG. 17.

FIG. 18.

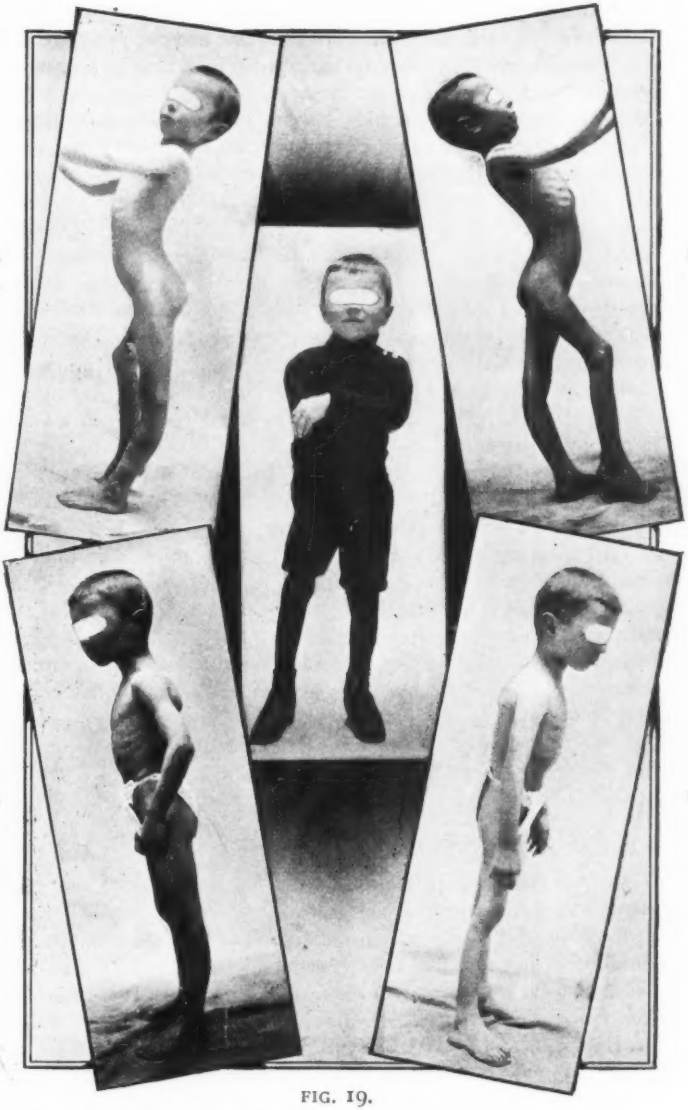


FIG. 19.

Fig. 12: G. T., Recumbent; note lordosis and flexion. Fig. 13: G. T., Recumbent; lordosis obliterated by further flexion. Fig. 14: G. T., Recumbent; flexion corrected by subtrochanteric osteotomy. Figs. 15 and 16: G. T., Erect; attitude before operation. Figs. 17, 18, and 19: G. T., Erect; attitude after operation.

end of that time may probably be discarded. It is anticipated that then a useful range of movement will have returned, and the patient will be able to walk freely with little or no perceptible limp and no appreciable deformity.

When the local lesion is healed, but bony ankylosis in a faulty position persists, the deformity is often corrected by dividing the femur below the ankylosed joint. This operation is a purely orthopædic measure, and not directed against the disease. It is never necessary if efficient treatment has been undertaken from the onset of the disease.

Case IV.—A boy, G. T., aged six years. Figs. 11-19 illustrate a patient so deformed and requiring operative treatment for the correction of the deformity. The little boy had been the subject of tuberculous disease of the right hip-joint, which had resulted (as shown by the skiagram) in bony ankylosis in a faulty position. Fig. 12 shows the flexion of the femur and associated lordosis of the spine. In Fig. 13 the spine is shown straightened by further flexion of the femur, which is now almost at right angles to the trunk. Figs. 15 and 16 show the attitude of the patient when standing. No amount of extension would straighten such a limb. The thigh-bone was therefore divided by a chisel and set straight in an abducted position to compensate for the shortening. Figs. 14, 17, 18, and 19 demonstrate the result obtained after operation. In such an instance the hip-joint will remain perfectly stiff (*cf.* Figs. 4-11), but no considerable deformity remains, and the limb is in a useful and safe position.

Endeavours should therefore, as a rule, be made not only to reduce deformity in hip disease, but, where possible, to secure a mobile and not a fixed joint. It is found that after efficient treatment the prolonged use of a celluloid splint is frequently rewarded by the return of excellent movement.

Fixed Joints in Tuberculous Hip.

There remains a certain number of cases of active hip disease where a patient is admitted with more or less deformity which, while not absolutely fixed, resists attempts at correction by extension, and the patient's condition does not improve if extension is persisted in. These cases, left without local treatment, will get further deformed. It is wisest here not to immediately attempt correction, but to fix the joint in plaster in its faulty position for a prolonged period. When the disease is quiescent, it will be found that in some cases some mobility has returned, and that if now tenotomy is performed and extension is carefully applied the deformity may be corrected. The limb in such cases should be maintained in the corrected position in a splint for a considerable time. The disease is then unlikely to recur, and correction

will remain permanent. If, on the other hand, bony ankylosis has occurred, one of two alternatives present themselves: Either, if the deformity is only slight, as in Fig. 20 (here note the slight lordosis), it is better not to attempt further correction, but leave the patient with slight flexion, and make up the shortening by applying an O'Connor

FIG. 20.—A LONG PLASTER SPICA BEING APPLIED TO A PATIENT SUFFERING FROM TUBERCULOUS DISEASE OF THE RIGHT HIP-JOINT.
Note the lordosis, which indicates there is still slight flexion at the hip-joint.

extension or other high boot. If, however, the remaining deformity is extreme, tenotomy and subtrochanteric osteotomy will permit the leg to be brought straight and slightly abducted, and will leave the patient with a hip fixed in a corrected and safe position.

Subtrochanteric osteotomy is advised rather than osteotomy through or above the great trochanter, as the danger of cutting through an unsuspected encapsulated, but still potentially active, lesion is thereby

minimized. I have known such an accident occur, resulting in amputation at the hip-joint being later necessitated.

Those interested in the study and treatment of tuberculous affections of bones and joints may be referred to the First Medical Report regarding the work at Alton.[1]

SOME CONSIDERATIONS RELATIVE TO INFECTION IN TUBERCULOSIS.

By THEODORE SHENNAN,

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In responding to the Editor's request for a contribution dealing with the subject of infection in tuberculosis, I hope it may be considered of value if I amplify and discuss some of the data which formed part of my report presented to the last International Tuberculosis Conference of 1913.[2]

Statistical Data.

Most scientific workers and writers recognize that we are very liable to be led astray if too much reliance is placed upon statistics. If we consider, for example, how different is the practical experience and how varied the training, the scientific knowledge, the precision and skill in diagnosis of the multitude of medical practitioners upon whose certificates of death the Registrar-General's statistical tables are based, we must admit that in dealing with a disease such as tuberculosis its protean aspects must appeal to different men in different ways. In what is apparently a similar tuberculous process, one man may see a later or final stage, and another an earlier stage; one will focus his attention upon a metastatic terminal manifestation like meningitis, whereas another may lay more stress upon the local glandular or pulmonary lesion from which the tuberculous infection has been generalized. Hence the same case, displaying manifestations such as I have suggested, may be certified as tuberculous meningitis, or glandular tuberculosis, or phthisis pulmonalis, or general tuberculosis,

[1] Lord Mayor Treloar Cripples' Hospital and College, Alton, Hampshire: First Medical Report, by H. J. Gauvain, M.A., B.C. With Foreword by the Right Hon. Lord Moulton, P.C., K.C.B., F.R.S. Published by Horace Marshall and Son, Temple House, Temple Avenue, and 125, Fleet Street, London, E.C., 1915. Price 1s. net.

[2] See the writer's article on "The Morbid Anatomy of Tuberculosis in Man." *Lancet*, London, February-March, 1914.

according to the indications regarded as most important by the individual practitioner. Moreover, as doctors generally become accustomed to a more precise nomenclature, and to the employment of more exact methods of diagnosis, ambiguous terms, such as "scrofula," tend to disappear from the Registrar-General's tables, not because such morbid conditions themselves have ceased to prevail, but because cases formerly classed under these headings are now placed under others which more correctly indicate the nature of the disease.

But even if we admit the innate frailties of statistics, we may gain some information which seems important from these special statistics in which we are interested—the Registrar-General's Tables of Death-Rates from different diseases—provided that we deal with large numbers of individuals over considerable periods of time, the wide extent of our inquiry tending to reduce the range of probable error.

TABLE I.[1]— STATISTICS GIVING THE DEATH-RATES FROM TUBERCULOSIS PER MILLION LIVING AT ELEVEN AGE PERIODS, IN ENGLAND AND WALES AND IN SCOTLAND, CALCULATED FROM THE REGISTRAR-GENERALS' REPORTS, 1891–1900 AND 1901–1910.

Ages.	England and Wales.						Scotland.					
	1891–1900.			1901–1910.			1891–1900.			1901–1910.		
	All Tuberculosis.	Phthisis.	Tuberculosis, not Phthisis.	All Tuberculosis.	Phthisis.	Tuberculosis, not Phthisis.	All Tuberculosis.	Phthisis.	Tuberculosis, not Phthisis.	All Tuberculosis.	Phthisis.	Tuberculosis, not Phthisis.
All ages	2,010	1,391	619	1,648	1,157	491	2,361	1,684	677	2,090	1,380	710
0 to 5	3,930	413	3,517	2,880	327	2,553	3,841	516	3,325	3 760	403	3,357
5 ,, 10	724	206	518	665	165	500	1,165	376	789	1,170	300	870
10 ,, 15	669	368	301	586	283	303	1,196	745	451	1,090	560	530
15 ,, 20	1,396	1,144	252	1,124	872	252	2,485	2,124	361	1,930	1,510	420
20 ,, 25	1,936	1,730	206	1,575	1,369	206	2,954	2,701	253	2,430	2,100	330
25 ,, 35	2,302	2,135	167	1,884	1,701	183	3,014	2,801	193	2,520	2,250	270
35 ,, 45	2,742	2,592	150	2,137	1,971	166	2,772	2,617	155	2,310	2,100	210
45 ,, 55	2,492	2,362	130	2,148	1,990	158	2,093	1,971	122	1,980	1,790	190
55 ,, 65	2,007	1,881	126	1,828	1,664	164	1,682	1,573	109	1,560	1,380	180
65 ,, 75	1,263	1,154	109	1,235	1,087	148	1,105	1,021	84	1,090	910	180
75 upwards	512	437	75	558	440	118	542	466	76	502	391	111

The above table shows noteworthy differences between the death-rates from tuberculosis in England and Wales and in Scotland, and seems to indicate that, even in these countries, so closely related in most respects, important differences exist in the conditions of life of the inhabitants, and in the possibilities and modes of infection by the tubercle bacillus.

Scotland is apparently about ten years behind the sister countries in

[1] In presenting these statistics, I acknowledge with pleasure the help of Dr. Crauford Dunlop, the Director of Medical Statistics for Scotland, who had them calculated for me.

the fight against tuberculosis, the total tuberculosis death-rate for England and Wales during the 1891-1900 decennium approximating to, but still being below, that for Scotland during the later decennium. The death-rate from phthisis pulmonalis for Scotland during the 1891-1900 period was apparently nearly 300 per million higher than that for England and Wales during the same period; and ten years more were required to reduce it to the 1891-1900 figure for England and Wales. Comparing the corresponding figures for 1901-1910, the Scottish death-rate from phthisis was still 223 per million higher than that for England and Wales.

Another interesting point of difference brought out by this table is that in Scotland the maximum death-rate from phthisis pulmonalis during both decennia was reached in the 25-35 age period, whereas in England and Wales it was reached in the 35-45 age period during the 1891-1900 decennium, but in the 45-55 age period during the 1901-1910 decennium, this being the result of a great reduction—over 600 per million—in the death-rate in the 35-45 age period, sufficient to bring the figures for this period very slightly below those for the 45-55 period.

The incidence of all varieties of tuberculosis on the earlier years of life is evidently much heavier in Scotland than in England and Wales, and this no doubt accounts to some extent for the earlier occurrence of the maximum phthisis death-rate in Scotland, the more resistant and the immune individuals surviving, so that the phthisis death-rates for most of the later age periods are distinctly below those for England and Wales. The ultimate explanation is not immediately apparent, but one would judge that it is not wholly to be found in the more severe climatic conditions prevailing in Scotland.

All the statistics available illustrate the well-recognized higher incidence of tuberculous disease, other than pulmonary tuberculosis, on the earlier years of life, and its continuous diminution as age increases. But a comparison of the two Scottish decennial tables draws attention to a point which seems to have been missed, and which, if we can depend on these statistics merits serious contemplation. In these, every age period without exception during the later decennium shows an increase in the death-rate from these other forms of tuberculous disease.

On comparing the two tables for England and Wales, we find that the death-rates from tuberculous diseases other than phthisis have been greatly reduced in the 0-5 age period, and to a small extent in the 5-10 age period. They are practically stationary in the 10-25 age periods, and thereafter they show increases during the later decennium; but these are not so great as in the case of Scotland. These other forms of tuberculous disease are registered under the headings "tabes

mesenterica," "scrofula," "tuberculous meningitis," "osteitis," and "arthritis." If, then, these figures are correct, they show that there is something seriously wanting in the measures taken for the prevention of infection. Further, account must be taken of recent investigations which demonstrate that a high percentage of cases of tuberculous osteitis are of bovine origin, and a similar etiology has long been recognized for a large proportion of cases of tabes mesenterica. Therefore, much of this apparently increasing death-rate is caused by forms of tuberculosis which are to a great extent preventable.

As I have already remarked, however, it is permissible to accept these conclusions as strongly suggestive only, in view of the doubt as to the correctness of many of the diagnoses upon which the tables are based.

I found some support for the above conclusions in my post-mortem statistics from the Royal Edinburgh Hospital for Sick Children. The numbers are small, and concern only 1,416 children, of whom 562 either died from tuberculosis, or, having died from other causes, showed evidence of active or latent tuberculosis in some part of the body.

TABLE II.—GLANDULAR TUBERCULOSIS IN CHILDREN, POST-MORTEM DATA.

Tuberculous Lesion.	Years.	
	1886–1902.	1910–1913.
Lymphatic glands tuberculous ...	83·7 per cent.	69·4 per cent.
Thoracic glands tuberculous ...	69·2 ,,	53·1 ,,
Abdominal glands tuberculous ...	54·4 ,,	45·0 ,,
Both groups tuberculous	39·9 ,,	29·7 ,,
Thoracic glands alone affected ...	29·5 ,,	15·3 ,,
Abdominal glands alone affected ...	13·5 ,,	13·5 ,,

Four hundred and thirteen cases belonged to the 1886-1902 period, and 149 to the later period. The above table shows that there was a very considerable percentage diminution in the cases with thoracic gland tuberculosis coming to post-mortem examination—that is, in tuberculosis of the glands draining the respiratory portal—whereas, in all cases in which the abdominal glands were tuberculous—that is, either alone or with accompanying thoracic gland tuberculosis—the percentage was diminished to a much smaller extent, and there was *no* percentage diminution in the cases in which the abdominal glands alone were affected. Table II., therefore, supplies evidence of distinct improvement in the case of tuberculous infections entering by the respiratory portal, but shows also that tuberculous infections by way of

the alimentary portal have diminished to a much lesser degree; and even this apparent moderate improvement is open to some doubt.

If we now consider how the matter stands in the case of smaller aggregations of individuals—for example, in different burghs in Scotland—the results here also are suggestive. During 1913 the Registrar-General for Scotland began to refer all deaths to the burghs in which the deceased had lived:

TABLE III.—CORRECTED DEATH-RATES IN CERTAIN OF THE LARGER BURGHS OF SCOTLAND, JANUARY TO JUNE, 1913, INDICATING GENERAL AND TUBERCULOSIS MORTALITY.

	Population to Middle of 1913.	Deaths (All Causes).	Deaths from Tuberculosis.		
			Total Number.	Per 100 Deaths.	Per 1,000 Population.
All Scotland	4,733,700	39,417	4,369	11·08	1·84
Perth ...	20,200	291	28	9·60	2·77
Greenock ...	77,800	762	106	13·90	2·72
Inverness ...	21,300	194	26	13·50	2·44
Glasgow ...	1,021,500	9,442	1,178	12·40	2·30
Paisley ...	85,600	691	92	13·30	2·15
Coatbridge	43,400	361	45	12·46	2·07
Dundee ...	165,900	1,522	169	11·10	2·03
Falkirk ..	35,600	259	33	12·70	1·85
Aberdeen ...	162,700	1,562	150	9·90	1·84
Edinburgh	320,300	2,474	286	11·56	1·78
Kirkcaldy ...	40,000	287	34	11·80	1·70
Airdrie ...	24,000	185	14	7·50	1·16
Forfar ...	10,400	85	4	4·70	0·77
St. Andrews	15,000	80	5	6·25	0·66

It is very evident, on considering the data supplied in this table, that the death-rates do *not* vary in accordance with the numbers or density of the population. Additional local conditions must prevail, such as variations in the rainfall, in drainage, in the situation of the towns, differences in the modes of life, and other factors which react on the local death-rate from tuberculosis. The actual table given applies, of course, only to the first half of 1913, and does not indicate the relative figures for these burghs, or their relative position in respect of the tuberculosis death-rate, for any other six-months' or twelve-months' period. They vary from year to year, so that a community, which prides itself one year upon its low tuberculosis mortality, may the next year be amongst those which suffer most heavily from the disease.

Professor Matthew Hay, Medical Officer of Health for the City of

Aberdeen, has drawn my attention to another very important point, and this is that, however much the total tuberculosis death-rates may vary in different burghs, in some of them the deaths from tuberculous diseases other than phthisis form constantly a higher proportion than in others. This problem merits careful investigation. Many of these cases are of bovine origin, and Professor Hay suggests that it may be—in part, at least—a question connected with the age of the cattle kept for milking purposes. In some parts of the country cows are purchased after calving, and after one season of milking are fattened off, while still young, for the butcher. In other parts the cow is simply a milk producer, and passes through frequent successive calvings and lactations. Obviously, the older a cow is, particularly if it be kept under insanitary and unhygienic conditions, the more liable is it to acquire tuberculosis and its milk to become infective.

THE EXAMINATION OF "CONTACTS" AT A TUBERCULOSIS DISPENSARY.

By NIVEN ROBERTSON,

M.B., D.P.H.,

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In connection with the work of a tuberculosis dispensary, one frequently hears the use of this term—the "march-past" of the contacts. I do not think a more erroneous or absurd expression could well be found. The examination of tuberculous contacts should be anything but a "march-past." The chief aim of the examination of such subjects is to discover the existence of pulmonary or other forms of tuberculosis in their earliest and most curable stage. This certainly cannot be done by a "march-past." At its initial stage tuberculosis of the lungs is often only recognizable by the most careful objective examination. Many contacts are really subjects of early tuberculous infection, although they themselves may look the picture of health, have no subjective symptoms, and present no complaint that they think worth mentioning. Indeed, many of these persons think it absurd that they should be asked to come to a tuberculosis dispensary at all, and oftentimes it is only with the greatest difficulty that the health visitor connected with the home visiting department of tuberculosis work can persuade such people to come for examination.

The examination of a contact is one of the most difficult and laborious parts of the duties of a tuberculosis officer. If a contact is examined in a superficial manner, the whole aim and object of the examination is in danger of being defeated. Such a person may have, for example, no symptoms such as cough, night-sweats, wasting, feverishness, or general lassitude, and yet the disease may be in an incipient stage. The physical signs may be confined to a few crepitations localized, perhaps, in one axilla, or there may be only a slight prolongation of expiration at one apex. If the examination is done on the so-called "march-past" system, and the axillary region left unexamined, or the apex cursorily passed over, then the contact will probably be sent away with the conviction that he is quite free from tuberculosis. What happens in such a case? The contact rests content on a false security. Perhaps in a few months he develops "slight cough" and feels tired at his work, but these give him no sense of danger. He ascribes such symptoms to being "run down," or due to the development of "a slight cold," because a few months ago he was passed as quite free from tuberculosis. He will declare that he was told by the expert at the dispensary, just three months ago, that he was "quite free from any sign of tuberculosis." If he had not been "marched past" as a contact, the slight cough and the first symptoms, which developed three months later, would probably have frightened him, and as a result he would very likely have gone to his doctor, and by this time, the physical signs being probably more evident, he would be given suitable advice and treatment. Instead of that, resting on a false security, he continues his vocation, getting steadily worse, till finally he is compelled to seek help. It would then be a just retribution to the tuberculosis officer who had passed him, if the case returned to him in the third stage as an example of his want of care.

The Clinical Examination of Consumptives.

The chief difficulty in the examination of contacts is due to the dubious nature of the earliest physical signs of pulmonary tuberculosis. There are three errors which one must avoid in the examination of a doubtful contact case: (1) Diagnosing pulmonary tuberculosis when such does not exist. The physical signs present in consumptives are sometimes met with in non-tuberculous conditions. (2) Overlooking the existence of pulmonary tuberculosis when it is present. (3) Interpreting the physical signs of pulmonary tuberculosis as evidence of active tuberculous disease when the lesion is an obsolescent one.

In the examination of contacts with dubious symptoms and physical signs, errors cannot be avoided by resting satisfied with one examination only or a mere "march-past." They can only be prevented by securing the repeated examination of such contact cases, and the chief

aim I have had in writing this article has been to show that a tuberculosis dispensary is not a place for the examinations of contacts, so much as a centre for the continued observation of contacts by repeated examinations. A dubious contact should therefore have treatment, and the treatment should be of a passive character until the diagnosis is certain. Continued observation is the great essential. The examination may be repeated every week, every month, or every three months, according to the degree of doubtfulness of the case. The aim is that as few cases as possible of early tuberculosis are to be missed, and that non-tuberculous cases are not to be treated as tuberculous. If the time of the tuberculosis officer permitted, it would be more perfect if every contact were examined more than once. I exclude the contact cases in which the disease is so advanced that there can be no doubt of the presence of active tuberculosis. In many cases the physical signs are so doubtful in contacts that one tuberculosis officer will diagnose the case as pulmonary tuberculosis, while another, equally competent, will dogmatically affirm its absence; while a third will say the case is doubtful and requires watching. I think that the last course in such cases is often the most correct, as it provides a happy medium in the line of service. The diagnosis often depends on the point of view of the tuberculosis officer. One perhaps makes the diagnosis of tuberculosis because, although it may not certainly be of this nature, he thereby avoids all risk of missing the disease, and by treating the case as such he feels that if he errs he is erring on the side of safety, both in the interests of the patient and the safety of others. Another tuberculosis officer is liable to miss a considerable number of doubtful early cases, as he diagnoses the absence of tuberculosis and never sees the case again. According to the method recommended, the contact is kept under observation for some time, allowing his progress to be watched and fully considered in all its bearings. The patient thus avoids the inconvenience of notification, and the possibility of the case being left undiagnosed is also absent. In regard to the three types of error, I will only quote a few cases, but could, if space was available, detail many others:

1. Example of first error. It is possible that if only one examination had been made of this doubtful case it would have been erroneously diagnosed as pulmonary tuberculosis. M. H., female, seen on August 27, 1914, at Bristol Dispensary, with doubtful fine crepitations at the right base posteriorly. Diagnosed as query pulmonary tuberculosis. Seen a few months later, she had some pain in the shoulder and still some crepitations at the right base. She was kept under observation and seen again. On this occasion there were no adventitious sounds, and she was quite well. She was probably suffering from œdema of the base of the lung of a temporary nature, as she was a large, fat woman

whose heart was defective. She remained unnotified, and was not treated as a tuberculous case.

The physical signs of early cases of pulmonary tuberculosis may be the same as many non-tuberculous conditions. Prolonged expiration with a few crepitations at one apex may indicate early tuberculous involvement, collapse of a portion of lung, or a transient bronchial catarrh. It is only by continued observation of these cases that one can arrive at a definite reliable diagnosis, when tubercle bacilli are absent from the sputum. If the physical signs permanently remain or increase on further examinations, it is more likely that the case is tuberculous.

2. The second error, as above enunciated, is illustrated by the following case: S. W., male, æt. 27. Examined on March 1, 1914. Very few symptoms, except readily tired. The physical signs consisted of slight dulness under the right clavicle. Such unequivocal physical signs might be due to a localized collapse of a temporary nature or to a healed lesion. I asked the patient to be sure to return in three weeks for further examination. Instead of this he went to the country for three months. On his return he was much worse, and was sent to bed. The physical signs were now such as evidenced a third stage of the disease, and he was markedly emaciated and very weak. He died three weeks later. If this patient had undergone the frequent examinations desirable, he would have had the necessary treatment sooner, and the disease would have been dealt with in a less hopeless stage.

Error is sometimes committed owing to the evanescent and variable nature of the physical signs of active disease. This evanescence of physical signs is especially common in children, where the physical signs often depend in amount on the degree of pressure of enlarged bronchial glands upon the return flow of lymph from the lungs. The two following cases out of many may be noted as examples: F. B., female, æt. 12. Examined December 16, 1914. History of cough, hæmoptysis, and sputum, for years. Numerous loud crepitations and ronchi heard all over both lungs. Re-examined three weeks later, when no crepitations could be detected, and only harsh bronchial sounds here and there. Supposing I had only examined this case but once, and that on the later occasion as a contact, without inquiring into the history, I should probably have missed all the physical signs sometimes present on other occasions, and have passed her as a non-tuberculous subject.—K. S., male, æt. 8. On first examination numerous crepitations and rhonchi all over both lungs. On a second examination a few weeks later almost no physical signs.

Another reason for the thorough examination of doubtful contacts, and deciding whether the physical signs are due to pulmonary tuberculosis or some other condition, is due to the psychological condition of

the contacts themselves. For example, in a family a case has died of tuberculosis of the lungs, and the contacts are examined. Perhaps all the contacts of this case are then found free from disease. It is impressed upon them, however, that on the appearance in the future of any symptoms, such as cough, expectoration, etc., they should at once return again for thorough examination. Such advice is necessary, or probably they will not return at all until too late. The result is, however, that frequently they return for examination when the symptoms are not due to tuberculous disease. It is then the duty of the tuberculosis officer to decide the difficult question of whether the symptoms are due to tuberculous involvement which the contact is afraid of or due to other causes. To take a concrete example: A father dies of tuberculosis in December, 1914. In the following January the children were examined at the dispensary and found free from tuberculosis. Six months later one child developed a lobar pneumonia of a mild type. It was kept in bed as a feverish cold, but the cough and expectoration did not disappear. The child, recovering from the acute attack, was brought to the Dispensary. Crepitations and dulness were found at the base. The mother was anxious to know if the child was tuberculous, like its father. These signs and symptoms may all be due to an unresolved pneumonia, which will clear up as the child grows stronger. They may be due to tuberculosis of the base, or they may depend on an unresolved pneumonia infected by tubercle bacilli. This question can only be decided by careful further examination, not by a "march-past." In such a case it is sometimes better to treat the general condition, and see if the physical signs clear up. A Von Pirquet test, if negative, would in the view of some be of value. Also a "contact" of the same family may develop a bronchitis or asthma, which sometimes presents physical signs very like that met with in chronic tuberculosis. The patient comes to the dispensary to be relieved of doubts. It may require continued observation of such a contact to be able to relieve such anxieties.

3. And now as to the third error. A very large number of people living must have physical signs indicative of old tuberculous trouble. When one considers the figures of Hamburger and Monti, who found 97 per cent. of the children between the ages of fourteen and fifteen in the schools of Vienna react positively to the Von Pirquet test, one realizes the difficulty experienced in early contact cases presenting some physical signs of saying whether these are due to active or passive disease. These 97 per cent. of schoolchildren must presumably have had physical signs of tuberculous disease. The physical signs need not, however, be perceptible to our present means of investigation by physical examination. They might be only microscopic, but a microscopic focus may become active and advanced disease in a

few weeks. A contact may have physical signs of tuberculosis, but not necessarily require treatment. Such a case, if it had not come to the dispensary, might have passed through life oblivious of the existence of any suspicious signs of latent trouble. Possibly many of us in apparent robust health have even now very slight physical signs of an old tuberculous lesion; but not having been, as far as we know, contacts, we never knew, and never will know, the threatening danger. In many such cases, to prove whether slight physical signs are due to an old focus, which can best be left alone, can only be accomplished by repeated examinations and prolonged observation. I have met with many cases in my own experience in which the physical signs were probably due to an obsolete focus, but in which treatment of an active nature was being given. Here is an example:

L. Y., female, æt. 18. Examined by myself on two separate occasions—first on November 12, 1914. She then had slight prolonged expiration at right apex, slight increase in vocal resonance, and a little retraction at same area. Weight was 53·7 K. No symptoms. I put her down as doubtful, and asked her to return in three months. Re-examined on February 7, 1915. Physical signs found exactly the same as at first examination. Weight 54·2 K. Asked to return in two months. Re-examined. She then left my district, and was seen a month later by my colleague in his district. He diagnosed her as possible pulmonary tuberculosis, but the physical signs were still the same and her general health was no better and no worse, and still there were no symptoms. She is now being treated, and the condition remains the same. In all probability the condition would have remained the same for the rest of her life without any treatment, but she would require to be kept under close observation for about a year to be sure of absolute quiescence.

The Examination of Contacts.

I think by these remarks I have shown that a tuberculosis dispensary should be a place, not for a "march-past" of contacts, but for the continued observation of contacts. The examination of contacts should therefore be very complete and thorough. The history past and present should be inquired into as carefully as, if not more carefully than, in an ordinary case sent up for diagnosis and treatment. A contact in perfect health, unless asked, will rarely volunteer the information that he or she has had a hæmoptysis or pleurisy years ago. The local dulness, retraction, or bronchial breathing, found on examination of the chest, will be explained and regarded as a possible lurking source of future trouble, and requiring watching from time to time. First, careful history-taking is essential. Second, careful questioning as to present symptoms, however slight, must be insisted on. Third, careful physical examination

must be made. The chest must be stripped to the waist, and the whole of both lungs carefully examined by the usual processes of inspection, palpation, auscultation, and percussion. If dubious signs are noted, the other more laborious tests may have to be applied—perhaps tuberculin diagnostic tests made, effect of exercise on temperature noted, opsonic index taken, albumin tested for in sputum, and so on.

These measures require far more time than the majority of tuberculosis officers can spare, but it is just in suspicious contacts that such data are required. In child contacts the same routine must be gone through, but also as a routine procedure one should investigate for the presence of tuberculosis in the bronchial glands. For this purpose it is necessary to examine for the presence of small nodular glands in the supraclavicular area; these are known as Philip's nodes. The presence or absence of distended venous radicles on front or back of the chest may be of importance. Eustace Smith's sign may be tested, and Ewart's area can be mapped out. With the presence of such signs as (1) Eustace Smith's murmur, (2) distended venules, (3) Philip's nodes, (4) enlargement of Ewart's area, (5) altered spinal percussion, (6) dry hacking cough, and (7) prolonged expiration and dulness of one apex, one can safely diagnose tuberculosis of the bronchial glands. If the case were X rayed, one might confirm the diagnosis still further. Such a case can usually be cured by a course of tuberculin, the glands becoming fibrosed and the tubercle bacillus isolated. A tuberculosis officer should attempt to deal with as many children at this stage as possible. It is even more difficult in such a case to decide whether actual treatment is necessary or not. This will depend more on the presence of symptoms and general condition than on physical signs. The important routine is, therefore, the continued observation of contacts. Frequent observation requires the keeping of records of all contact cases very accurately. I have found such a record, which I have kept for two years, extremely interesting and useful. This record is best kept in the form of a book called a "contact book." On one page there should be a column having the following headings:

Date.	Name.	Age.	Address.	Contact of.	History and Physical Sign.

On the opposite page the various cases can be continued, and the page divided into vertical columns, where the results of future exami-

nations can be recorded if the case requires further observation. A careful record of the weight of all doubtful contact cases must be kept. An increase or decrease in weight at a future examination is of value in determining as to the quiescence or activity in the physical signs of a doubtful contact case.

It may be of interest to give the results of my own personal records during a period of nineteen months. Of 123 contacts examined in this period at the Bristol Tuberculosis Dispensary, 39 per cent. had doubtful physical signs of active pulmonary tuberculosis, while 13 per cent. had positive physical signs. Of these 13 per cent. (4 per cent. were positive at the first visit), 9 per cent. were doubtful, but became positive on further examination. Forty per cent. had negative physical signs, and only 6 per cent. having doubtful physical signs became negative.

Of 193 contacts examined at Bath Tuberculosis Dispensary, 44 per cent. had doubtful physical signs of active tuberculosis of the lungs, 12 per cent. had positive physical signs, and of these 4 per cent. were positive at first visit, and 8 per cent. doubtful became positive. Forty per cent. had negative physical signs of active tuberculosis, and 3 per cent. having doubtful physical signs became negative.

Of 148 contacts examined at Radstock Dispensary, 37 per cent. had doubtful physical signs of active tuberculosis, 14 per cent. had positive physical signs, 40 per cent. negative physical signs, and 7 per cent. of doubtful cases became negative.

Out of the total 464 contacts examined, 40 per cent. gave doubtful physical signs of active pulmonary tuberculosis, 13 per cent. positive physical signs. Of these 7 per cent. were positive at first visit, and 6 per cent. doubtful became positive. Forty per cent. gave negative physical signs, and 5 per cent. having doubtful physical signs became negative.

All together, 51 per cent. had, therefore, doubtful physical signs of active pulmonary tuberculosis in the total 464 contacts. Eleven per cent. had doubtful physical signs in which, by further observation, one was able to decide whether it was an active or a quiescent lesion. Taking these 51 per cent. separately, it is shown, therefore, that in 20 per cent. of doubtful contacts, by continued observation, one can decide definitely whether the signs are due to a lesion still active or if obsolete. In the other 80 per cent. doubtful contacts the physical signs remained, but showed no change, and no symptoms developed in the period in question—therefore probably quiescent. If the physical signs had increased or symptoms had developed, such would be put down as positive. If the physical signs disappeared and no symptoms developed, such would be classed as becoming negative. If, therefore, 20 per cent. of doubtful active disease can be proved definitely active or quiescent by continued observation at the dispensary, I have shown that the continued observation of contacts is worth the trouble, especially if

the 12 per cent. becoming positive thus insure obtaining treatment at the earliest stage.

Fifty per cent. of the contacts required, therefore, continued observation. One of the chief functions of the tuberculosis dispensary is to act as a centre where contacts can not only be examined, but can be kept continually in touch with and kept under careful observation.

THE BEDROOM OF THE CONSUMPTIVE.

By GEORGE JESSEL,

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Success in the treatment of consumption depends largely upon close attention to detail. The home hygiene of the patient is admittedly of paramount importance. The circumstances of each individual patient require fullest consideration, and, in many cases, anxious thought, before satisfactory arrangements can be made. Herein lies much of the failure of domiciliary treatment. In the majority of cases the busy general practitioner has in the past either not thought it worth while, or has not found time to care for such details. It is only with the advent of dispensary supervision that the home treatment of consumption on a large scale has been placed upon a satisfactory basis. The tuberculosis officer and dispensary nurse supply those essential elements in the home treatment of phthisis that have hitherto been more or less neglected.

Owing to various causes, principally economic, the majority of consumptives perforce spend the greater part of their time at home during their illness. During this time the night, and not seldom, if the supervision is efficient, the day also are passed in bed, owing to rise of temperature or other causes. One of the greatest dangers to which persons suffering from pulmonary tuberculosis are exposed while at home results from conscious or unconscious neglect to stay in bed when they are feverish. The circumstances connected with the bedroom are thus clearly of importance, and demand careful attention for the sake of the other inmates of the house, as well as of the patient. The ideal aimed at is to prevent the spread of infection to others in the house, and at the same time to place the patient under as favourable conditions as possible.

TABLE I.

IMPROVEMENTS EFFECTED BY THE BOROUGH OF WIGAN DISPENSARY NURSE.

County Borough of Wigan—Cases of Tuberculosis (All Forms) Notified in 1915.

Conditions found at Nurse's First Visit, 1915.		Conditions found at Nurse's Last Visit, 1915.
	I. CASES HAVING SEPARATE BED.	
83	No other person in bedroom.	168
44	1 other person in bedroom.	40
50	2 other persons in bedroom.	46
20	3 ,, ,,	20
20	4 ,, ,,	3
3	5 ,, ,,	3
	II. CASES NOT HAVING SEPARATE BED.	
10	1 other person in bed.	17
12	1 ,, ,, and 2 others in room.	8
10	1 ,, ,, 3 ,,	4
10	2 other persons in bed.	3
6	2 ,, ,, and 1 other in room.	14
10	2 ,, ,, 2 others in room.	6
10	2 ,, ,, 3 ,,	2
9	3 ,, ,, 1 other in room.	4
10	3 ,, ,, 2 others in room.	0
6	3 ,, ,, 3 ,,	0
3	4 ,, ,,	0
10	4 ,, ,, 2 ,,	0
5	5 ,, ,,	0
	III. KITCHEN.	
0	Separate bed.	2
6	1 other in bed.	0
3	2 others in bed.	0
340	Total cases notified	340

I. Prevention of Spread of Infection.

Without in any way attempting to disregard the danger of secondary infection of others when cases are treated at home, this danger may be reduced considerably, if the patient is made clearly to understand the infectious nature of his disease, and is carefully instructed as to

TABLE II.

IMPROVEMENTS EFFECTED BY THREE LANCASHIRE COUNTY COUNCIL DISPENSARY NURSES.

Pulmonary Tuberculosis, 1915 (*New Cases*).

Conditions found at Nurse's First Visit, 1915.		Conditions found at Nurse's Last Visit, 1915.
	I. CASES HAVING SEPARATE BED.	
157	No other person in bedroom.	262
24	1 other person in bedroom.	28
26	2 other persons in bedroom.	18
3	3 ,, ,,	4
3	4 ,, ,,	2
1	5 ,, ,,	1
	II. CASES NOT HAVING SEPARATE BED.	
45	1 other person in bed.	20
28	1 ,, ,, and 1 other in room.	5
10	1 ,, ,, 2 others in room.	2
7	1 ,, ,, 3 ,,	1
1	1 ,, ,, 5 ,,	0
10	2 other persons in bed.	7
1	2 ,, ,, and 1 other in room.	0
4	2 ,, ,, 2 others in room.	0
4	2 ,, ,, 3 ,,	0
1	2 ,, ,, 4 ,,	1
1	2 ,, ,, 5 ,,	0
5	3 ,, ,,	0
	III. KITCHEN.	
17	Separate bed in kitchen.	9
9	1 other in bed.	0
3	2 others in bed.	1
1	3 ,,	0
361	Total cases	361

the disposal of the sputum. The possibilities of domiciliary treatment[1] depend largely at the present time on efficient dispensary supervision.[2] Without this the dangers[3] are obvious. Secondary cases in a household are only too common, but it will not seldom be found that the first

[1] *British Medical Journal*, April 11, 1914.
[2] *Medical Officer*, May 9, 1914.
[3] Holden: *Medical Officer*, February 28, 1914.

sufferer was more or less unaware of the nature of the disease, and consequently of the importance of precautions, and that the supervision of the patient was neglected. In slum districts, of course, there will be many cases where instruction and supervision are of little use, but this is certainly not the case in the average working-class home, with which the present paper is concerned.

In the supervision of patients' home hygiene the dispensary nurse should play an important part.[1] On arrival at a case which has been recently notified by a general practitioner, she will frequently find the bed in the kitchen or living-room, or, on the other hand, that no change in the usual sleeping arrangements has been made. Her first care must be to arrange, if possible, for a separate bedroom for the patient. This can often be managed without difficulty; at other times this is difficult or impossible, and the best arrangements that can be made must suffice. Sometimes one or more members of the family can sleep at the house of relatives or friends. Sometimes the front parlour can be converted into a bedroom; not infrequently there is actually an empty bedroom, but owing to poverty no bedstead or bedding is available. In this case the loan of these by a Care Committee[2] will solve the difficulty. Even where a separate bedroom is impossible, a separate bed can usually be obtained. The tables on pp. 76 and 77 show what was accomplished in 1915 in this direction.

Thus, although a separate bedroom is often impossible, it can be obtained in a large number of cases, while a separate bed, at any rate, is usually possible. The objection that the other inmates of the house will be overcrowded is met if one or more sleep elsewhere, but, on the other hand, even this, though clearly undesirable, is probably less important than the actual danger resulting from the consumptive person sharing the room or bed with another.

II. The Welfare of the Patient.

The bedroom should be divested of all unnecessary hangings, floor coverings, furniture, pictures, ornaments, etc. Where the reasons are carefully explained, serious opposition is uncommon. A short curtain across the lower half of the window may with advantage replace long lace curtains. The window should be kept widely open and the door likewise. A fire helps ventilation, and is useful for the disposal of sputum, etc., but is better absent unless the room is kept cool. The position of the bed is important, so as to avoid draughts and the blowing in of rain. If the room is square, a good position for the bed is across the window, but about two yards away from it, the head of the bed being somewhat to one side, as shown in Fig. 1. The patient X

[1] *Public Health*, August, 1915.
[2] *Medical Officer*, August 28, 1915

is clearly not in a draught, and, if the curtain is withdrawn, can see out of the window. In an oblong room the bed must be placed as shown in Fig. 2, the patient X facing the open window. Sufficient warm clothing must, of course, be provided.

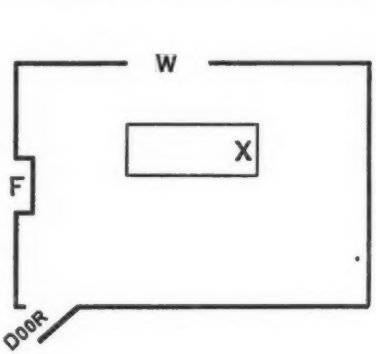

FIG. 1.

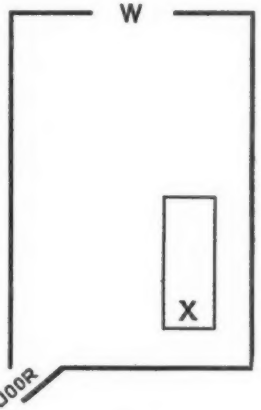

FIG. 2.

PLANS OF TWO BEDROOMS (SQUARE AND OBLONG) SHOWING SUITABLE POSITION FOR PATIENT'S BED.

X represents patient's head.

Where the importance of the sleeping arrangements has been impressed upon patients' friends at the outset, it is surprising in how large a number of cases the conditions are successfully altered, and after a while the patients themselves are frequently unwilling to return to the old order of things.

Sleeping shelters are extremely useful in many cases, where there are suitable places near the house for their erection. Unfortunately, it is only rarely in towns that the question can be considered.

DR. EDWARD LIVINGSTON TRUDEAU.

In Memoriam.

By S. ADOLPHUS KNOPF,

M.D., NEW YORK,

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Some five years ago it was my privilege to write, upon the request of the Editor of the British Journal of Tuberculosis, an appreciation of Dr. Edward Livingston Trudeau. To-day it is my sad duty to tell the readers of that journal that Dr. Trudeau is no more. He passed away on November 14, 1915, at his home in Saranac Lake, New York, surrounded by his family, friends, and pupils.

It may be well worth the while to repeat to-day in part what I said then of this great and remarkable man. Dr. Trudeau was born in New York City in 1848. At an early age he was sent to Paris where he attended the celebrated Lycée Bonaparte. As the result of his Paris sojourn, Dr. Trudeau not only mastered the French language technically, but spoke it with that beautiful genuine accent which can only be acquired by thorough study and, above all, by a lengthy sojourn with the cultured French during early youth. During my own studies in Paris, while preparing for my doctor thesis on sanatoria for tuberculosis, I corresponded with Dr. Trudeau, naturally in English. When I visited him for the first time, twenty years ago, after my return from Paris, I was not only surprised but embarrassed to hear him address me in the most perfect Parisian French. I was at a loss to reply with the same fluency and elegance which I had never attained but which he had not lost in spite of the many years that had passed since he returned to this country. He was truly master of two languages, for we all know that the English he spoke and wrote was of the purest and best type. Upon his return to the United States he entered the College of Physicians and Surgeons of New York, from which he was graduated as Doctor of Medicine in 1871. At the age of twenty-six he contracted tuberculosis, doubtlessly as a result of faithfully nursing his brother, who was afflicted with the disease, and who later on died of it. Dr. Trudeau went to the Adirondack Mountains with little hope of recovery; in fact, it was said that his medical advisers gave him six months to live. However, what appeared to be the end of his career was really the beginning of it. By his own indomitable energy and persistent outdoor life, he gradually mastered his symptoms, and became virtually a well man.

Himself re-established to health and strength, he at once became an enthusiastic advocate of the Brehmer-Dettweiler method (Dettweiler having added the "Liegekur," or rest-cure, to the "Frei-Luft," or

E. L. Trudeau

open-air cure, of Brehmer). Trudeau, however, did not favour the one-house system of the Germans, but advocated what is now known as the cottage system—that is to say, a number of cottages, containing not more than four or six beds each, grouped around an administration building. Being poor himself, he enlisted at once the help of philan-

thropists, and, thanks to his untiring energy and the generosity of his friends, the little one-cottage sanatorium gradually grew into a small village, so that to-day there are some forty odd cottages, an infirmary, a library, a laboratory, a reception building, and a church, comprised in the Adirondack Cottage Sanatorium. Thousands of persons have passed through this institution, most of whom have regained their health, or have improved sufficiently to pursue their occupations with safety. Patients have flocked to Dr. Trudeau for counsel and advice. One of the most distinguished of them was Robert Louis Stevenson, who had come from England in search of health.

A mind like Trudeau's naturally grasped with eagerness anything new on tuberculosis. Thus, when Koch gave to the world his epoch-making discovery of the tubercle bacillus, he did not wait until the work was translated in the current journals, but sent for the original German paper, asked a friend to translate it, and immediately went to work to improvise a crude laboratory in a small room, where he set to work to repeat Koch's experiments. There was no coal and no electric light in Saranac Lake in those days. The first laboratory was lighted by a kerosene lamp and heated by a wood stove, and on very cold nights the doctor often had to get up and replenish the fire. In spite of such difficulties, he succeeded in growing the tubercle bacilli in a home-made thermostat, heated by a kerosene lamp, and he was the second experimenter in the country to achieve this. After repeating Koch's experiments, the doctor soon began to make original ones. In the same week that Koch's announcement of the discovery of tuberculin was flashed across the ocean, Dr. Trudeau published in the *Medical Record* the result of his attempts to produce artificial immunity in animals by injecting tuberculin.

In 1893, while he was away in New York, the lamp connected with the thermostat exploded, and his home and library were burned to the ground. Two days later, Dr. Osler, now Regius Professor of Oxford, wrote him as follows: "Dear Trudeau,—Sorry to hear of your misfortune, but, take my word for it, there is nothing like a fire to make a man do the Phœnix trick." The prophecy was rapidly fulfilled. The next day George C. Cooper, a patient and friend, called on the doctor, and offered to build him a real laboratory that would not burn.

This magnificent laboratory of the sanatorium is located in the village of Saranac Lake, at some distance from the institution. Dr. Trudeau's careful experiments and studies on the use of tuberculin as a therapeutic agent have done much to show the danger of its indiscriminate use in the hands of inexperienced practitioners. His conservative and painstaking care in all his investigations have made him the ideal phthisiotherapeutist. In 1908, on the occasion of Dr. Trudeau's sixtieth birthday, his former pupils and assistants presented him with a

"Festschrift," containing many valuable contributions on tuberculosis science which had their origin in studies in the sanatorium and laboratory.

Those who have come into close contact with Dr. Trudeau will recall his personal charm. Few men of the medical profession were so greatly beloved and honoured as he. His Alma Mater, the College of Physicians and Surgeons, now the Medical Department of Columbia University, conferred upon him the honorary degree of M.Sc. in 1899, and the McGill University of Montreal gave him the degree of LL.D. in 1905.

In 1910 he was tendered the presidency of the Congress of American Physicians and Surgeons, which is held to be the highest honour within the gift of the medical profession. In May, 1913, he received the degree of LL.D. from the University of Pennsylvania. Custom requires the presence of those about to receive the degree, but in this case, owing to the doctor's illness at the time, precedent was waived, and the degree conferred *in absentia*—an added honour.

At the International Congress of Tuberculosis in Washington, Trudeau received an ovation whenever he appeared on the platform, and what he said then as greeting to the delegates will typify the man's labours and great modesty. Speaking of the achievements in the antituberculosis work, from the time when he started his professional career up to that day, he said: "For thirty-five years I have lived in the midst of a perpetual epidemic, struggling with tuberculosis, both within and without the walls, and no one can appreciate better than I do the great meaning of such a meeting. I have lived through many of the long dark years of ignorance, hopelessness, and apathy, when tuberculosis levied its pitiless toll on human life unheeded and unhindered; when, as Jacoud has tersely put it, 'The treatment of tuberculosis was but a meditation on death.' But I have lived also to see the dawn of the new knowledge, to see the fall of the death-rate of tuberculosis, to see hundreds who have been rescued, to see whole communities growing up of men and women whose lives have been saved, and who are engaged in saving the lives of others. I have lived to see the spread of the new light from nation to nation until it has encircled the globe, and finds expression to-day in the gathering of the International Congress of Tuberculosis, with all that it means to science, philanthropy, and the brotherhood of man."

The services Dr. Trudeau has rendered to the antituberculosis cause, to the medical profession, and to mankind at large, cannot be too highly estimated. His example has been followed by many. In 1885 his was the only institution in the United States deserving the name of sanatorium, and consecrated to the exclusive treatment of the tuberculous. To-day, in 1915, there are in the United States 600 sanatoria

and hospitals for the exclusive care and treatment of this class of patients. Aside of these 600 institutions there are 450 dispensaries which take care of the ambulant tuberculous patients, and a great number of day camps, night camps, open-air schools, and preventoria.

Dr. Trudeau was elected the first President of the National Association for the Study and Prevention of Tuberculosis. It is due to his inspiration that we count to-day in this country 1,500 associations which look up to the National Association as their mother society.

Of late Dr. Trudeau suffered a great deal as a result of his old tuberculous lesion. When artificial pneumothorax came into vogue a few years ago, he submitted himself to this treatment, and for a time the treatment gave very gratifying results. It was my privilege to see him shortly after he had ceased the treatments. With the enthusiasm of a teacher, he showed me a series of radiographs of his own chest taken before and after fillings with the nitrogen gas, explaining to me what I did not seem to understand, quite oblivious that he was talking of his own case. I ventured to ask him why he had stopped the treatment. For a moment he became sad, and then said: "It did not do me any more good; I have not been able to sleep at night since the last operation," and then he added smilingly: "You men who are doing artificial pneumothorax are far from knowing all about it." In this he was only too right.

Though illness and the loss of two beloved grown-up children—a son and a daughter—had left an impress of sadness upon Dr. Trudeau, he kept up admirably, was optimistic and cheerful most of the time, and until the very last took the keenest interest in the institutional and laboratory work of the Adirondack Cottage Sanatorium.

On October 30, 1915, a memorial tablet was unveiled in Saranac Lake in honour of Robert Louis Stevenson. Owing to his illness, Dr. Trudeau could not be present at the ceremony. Trudeau and Stevenson were friends and fellow-sufferers at one time, and it was natural for Trudeau to be glad to see his friend's memory thus honoured. Here is his last message: "It is a great regret that illness prevents me from attendance on the ceremony of unveiling the tablet to Stevenson. I think the memorial most appropriate, and naturally am greatly pleased that it should be placed here in Saranac Lake. No better tribute could now be made to him, and it is a great satisfaction to me to have lived to see it done."

Another event that tended to make the last hours of the great Trudeau happy was his learning that, thanks to a magnificent gift from an ardent admirer of his, Mr. Samuel Mather, of Cleveland, Ohio, a post-graduate medical college, to be known as the Trudeau School for Instruction in Tuberculosis Science, is shortly to be established at Saranac Lake. Thus, Dr. Trudeau's noble wish to

spread the best scientific knowledge of the prevention and cure of tuberculosis has become realized.

What Dr. Trudeau's friendship, inspiration, and example have been to me personally, how he encouraged me in my humble efforts in behalf of the anti-tuberculosis cause in the beginning of my career, I shall never forget; and the many encouraging letters he wrote me during the twenty years of our acquaintance will always remain to me precious and grateful souvenirs of a valued friend, a great teacher, and lover of his kind.

Some day, when the "Great White Plague"—that disease of the masses due to poverty, want, ignorance, and social injustice—will be no more, the name of Edward Livingston Trudeau will be gratefully remembered as one who taught us how to fight and conquer this great enemy of mankind.

INSTITUTIONS FOR THE TUBERCULOUS.

ALLINGTON MANOR SANATORIUM, EASTLEIGH, HANTS.

Dr. D. Fey, the senior Belgian physician now in charge as Medical Superintendent of the Sanatorium for tuberculous Belgian soldiers, situated at Eastleigh, in Hampshire, has kindly favoured us with particulars regarding the new establishment. The sanatorium has been founded by the Wounded Allies Relief Committee for wounded Belgian soldiers who have contracted or developed tuberculosis whilst serving in the present war. It is some four miles from Eastleigh, and is admirably suited for its purpose as a sanatorium. The manor-house and grounds which provide the sanatorium have been lent by the Right Hon. Lord Swaythling, Chairman of the Wounded Allies Relief Committee. This is the fifth home which this Committee has provided for disabled Belgian soldiers. The sanatorium is controlled by the Committee. The management is under the care of two Belgian physicians, assisted by an English matron and sisters. A consulting physician visits weekly. The sanatorium has accommodation for twenty-five men. It consists of a two-storied building, facing south-east. There are four wards, each containing four beds. There are patients' dining-room, recreation-room with billiard-table, matron and nurses' rooms, staff dining-room, kitchens and offices, and bath-rooms. The medical officers' cottage is connected by telephone with the sanatorium. The central building stands in four acres of ground, and has a charming exterior, its colouring of white standing out in pleasing relief against the surrounding verdure. It is approached by a short, winding carriage-drive, on either side of which are trees. Four revolving shelters have been erected, each containing one or two beds and fitted with easy-chair and other necessaries. A covered and well-ventilated shelter, suitably equipped, is open to the south, and here twice a day the patients spend their rest-hour. Through the courtesy of the Sir Lindsay Smith and the Wounded Allies' Relief Committee, Sanduna House, Kingsway, London, W.C., we are permitted to reproduce the accompanying illustration of one of the shelters. The usual form of treatment is carried out; where possible, graduated labour is employed, together with suitable combinations of rest and graduated exercises, good and variated food, fresh air night and day, and general hygienic management. The results have been excellent. The nearest railway-station is Eastleigh, on the L. and S.W. Railway. Telegrams should be addressed " Allington Manor, Fairoak."

OPEN-AIR SHELTER AT THE ALLINGTON MANOR SANATORIUM, EASTLEIGH, HANTS.

NOTICES OF BOOKS.

THE TUBERCULOSIS PROBLEM.

WAR has rendered the solution of all social problems more difficult and distant, and this is markedly the case in regard to tuberculosis, as is clearly evidenced in Dr. Arthur Newsholme's last report.[1] Six medical inspectors were employed in connection with the tuberculosis work of the medical department until the outbreak of war, when all routine inspectoral work was necessarily abandoned. From August, 1914, the work has approximately occupied the full time of two inspectors. Owing to the temporary impracticability of proceeding with schemes involving capital expenditure, there has been considerable reduction in the work of considering proposals for the erection of institutions for the treatment of tuberculous patients. In some instances, however, plans and proposals have been considered, in order that the authorities concerned may be able to commence building operations without delay at the end of the war. If this example were followed in other areas, it is likely that useful work would thus be prepared for men set free on the demobilization of the Army. Arrangements have been arrived at whereby Boards of Guardians have, in a number of localities, been enabled to transfer their tuberculosis patients from poor law infirmaries to public health institutions, in order to enable the former to be utilized temporarily as military hospitals. Arising out of the war, arrangements have been made for the treatment in residential institutions of uninsured soldiers suffering from tuberculosis on their discharge from the Army. During the year 1913 there were 37,055 deaths from pulmonary tuberculosis as compared with 39,232 in 1911 and 38,083 in 1912. There were also 12,421 deaths from non-pulmonary forms of tuberculosis during 1913 as compared with 13,888 in 1911 and 11,968 in 1912. During the year 1914, 41,525 cases of pulmonary tuberculosis among males and 34,584 among females were notified for the first time. The corresponding figures for the last eleven months of 1913 were 43,168 and 37,620 respectively. In the year 1914, 12,301 cases of non-pulmonary tuberculosis were notified among males and 11,087 among females. The corresponding figures for the last eleven months of 1913 were 18,952 and 17,399 respectively. The first table on p. 89 shows the ratio between the number of primary notifications during the years 1913 and 1914 and the number of deaths in the years 1912 and 1913 respectively.

The proportion of new cases notified per 100 deaths has been low. It may be expected to increase very materially when the tuberculosis service is in complete operation and the examination of contacts is more systematically carried out. It appears likely that a number of

[1] Forty-fourth Annual Report of the Local Government Board, 1914-15. Supplement containing the Report of the Medical Officer for 1914-15. [Cd. 853.] Pp. xxxiv+100. London: Wyman and Sons, Ltd., 29, Bream's Buildings, Fetter Lane, E.C. 1916. Price 6½d.

ENGLAND AND WALES.

	Number of Notifications per 100 Deaths.							
	Pulmonary Tuberculosis.				Non-Pulmonary Tuberculosis.			
	Males.		Females.		Males.		Females.	
	1913.	1914.	1913.	1914.	1913.	1914.	1913.	1914.
Administrative Counties	201	176	211	188	279	157	278	156
County Boroughs	225	206	266	224	369	200	375	215
Metropolitan Boroughs	245	210	236	258	441	240	442	257

medical practitioners fail to notify, because they do not appreciate the fact that investigation of cases of tuberculosis, non-pulmonary as well as pulmonary, is important, as likely to lead to the discovery of a source of infection or of undesirable housing or industrial conditions, and thus enable steps to be taken to prevent infection of other members of the family or to minimize conditions favouring infection. Dr. Newsholme very properly urges on medical officers of health the importance of communicating with practitioners who fail to carry out their duty to notify. During the year under report, medical inspectors have made several inquiries into the method of investigation after notification. In some areas inquiries are carried out on similar lines to those adopted in the investigation of cases of acute infectious disease. In one district the sanitary inspectors were instructed to limit their inquiries to housing and general sanitary conditions. Although in some respects inquiry as to tuberculosis may follow the lines of inquiry for an acute infectious disease, the methods required evidently diverge in important particulars, as does also the instruction of the patient as to means for preventing the spread of infection. It is shown that unless each notified case is made the subject of skilled inquiry and instruction, and arrangements are made for continued supervision of the patient, much of the advantage derivable from notification is lost. The following table indicates the progress made in the appointment of clinical tuberculosis officers in connection with tuberculosis schemes in areas outside London:

	August 30, 1913.	June 20, 1914.	June 26, 1915.[1]
County Councils	63	88	131
County Borough Councils ..	45	79	100
Joint Committees	1	6	7
Total	109	173	238

On June 26, 1915, one tuberculosis officer had been appointed for 145,000 persons in the administrative counties, and one for 110,000 in the county boroughs. In a circular issued on April 29, 1915, the

[1] Excluding temporary officers.

Board drew attention to recommendation (3) in par. 48 of the Final Report of the Departmental Committee on Tuberculosis, 1913, as to the additional qualifications which should be required for tuberculosis officers appointed after January 1, 1915, stating: "The Board trust that the Council, in making any fresh appointment, will have due regard to the recommendation, and, in framing their advertisements for candidates for the post of tuberculosis officer, will intimate that preference will be given to medical practitioners possessing these qualifications." The derangement caused by the war has made it impracticable to insist on this condition. The Board have approved of a considerable number of tuberculosis officers accepting military service, temporary arrangements being made for carrying on the tuberculosis work. Up to the end of June, 1915, about 30 per cent. of the tuberculosis officers had been freed for this purpose. In making temporary arrangements, the aim has been to secure a reasonably adequate service for the treatment of the sick, and to enable the county or county borough council to discharge their obligations to the local Insurance Committee under any agreement which may be in force. In some instances, the tuberculosis work has been undertaken by other members of the public health staff; in others, the services of school medical officers or the part-time services of sanatorium medical officers have been utilized; in a few instances women medical officers have undertaken the work; and in some instances the part-time services of local practitioners have been obtained. Under the circumstances, it has not been practicable in all cases to insist that temporary officers shall have had special experience in the treatment of tuberculosis, and it has been thought better to approve a not altogether satisfactory arrangement rather than to permit the temporary abandonment of the dispensary service. During 1912 and 1913 it was necessary in a number of instances to give temporary approval to premises for dispensaries which were not altogether satisfactory, pending the provision of suitable permanent premises, or until the requirements of the district were ascertained. A number of temporary dispensaries have now been replaced by permanent institutions. The number of replacements would have been greater under normal circumstances. The development of London dispensary schemes has been considerably delayed by the outbreak of war. At the end of June, 1915, seven municipal main and branch dispensaries, thirteen voluntary dispensaries, and nine dispensaries at general or special hospitals, were open. The establishment of additional dispensaries at four general and special hospitals, and of three municipal dispensaries, is also under consideration. Dr. Newsholme pointed out in his previous annual report that arrangements had been made to secure the wide experience of the medical staffs of general and special hospitals in the diagnosis of difficult cases. Each of the dispensaries included in the schemes of Metropolitan boroughs is affiliated to a hospital for consultation purposes. The following act or are prepared to act as consultation centres—Hospitals for Consumption: Brompton; Royal Hospital for Diseases of the Chest, City Road; City of London Hospital for Diseases of the Chest, Victoria Park; Mount Vernon, Fitzroy Square. General and Other Hospitals: The London; St. Bartholomew's; Guy's; St. Thomas's; Middlesex; St. Mary's; St. George's; King's College; University; Charing Cross; Great Northern Central; Royal Free; Dreadnought (Seamen's); West London; Great Ormond Street; Central London Throat and

	On July 18, 1914.		On June 30, 1915.	
	Institutions.	Beds.	Institutions.	Beds.
A.—*Provided by County Councils, County Borough Councils, or Other Sanitary Authorities.*				
1. Institutions used solely for the treatment of tuberculosis	20	1,339	39	2,086
2. Pavilions at isolation hospitals allocated permanently for the treatment of tuberculosis.	57	1,493	21	460
3. Pavilions at isolation hospitals used temporarily for the treatment of tuberculosis.			39	1,290
4. Small-pox hospitals used permanently in interepidemic periods for the treatment of tuberculosis.	30	1,076	10	415
5. Small-pox hospitals used temporarily, pending other arrangements.			19	792
6. Institutions for children	—	—	1	20
7 Observation beds at dispensaries	—	—	10	37
Total	107	3,908	139	5,100
B.—*Provided by Voluntary Associations or by Private Enterprise.*				
1. Special institutions for the treatment of tuberculosis, including consumption hospitals.	84	4,059	81	4,410
2. General hospitals	35	153[1]	48	289[1]
3. Children's institutions	13	726	19	952
Total	132	4,938	148	5,651
Total A. and B.	239	8,846	287	10,751

Ear. The record of the work of the dispensary service during 1914 is full of interest. In England, excluding Monmouth, the number of persons, including home contacts of notified tuberculous patients, examined during the year for the first time at or in connection with dispensaries was 82,311. Of these, 41,127 were found to be suffering from tuberculosis, and 41,184 were found to be non-tuberculous or doubtfully tuberculous. The extent to which the dispensary service is working may be gathered from the statement that, during the year 1914, 88 tuberculous patients were dealt with for the first time by the dispensary service for every 100 deaths occurring from tuberculosis (1913), and that 44 new tuberculous patients were dealt with by the dispensary service for every 100 primary notifications (1914). Most of the dispensaries have not been established sufficiently long to enable a reliable estimate to be formed of the extent to which the service is likely to be utilized. It may be noted, however, that in the dispensaries of several sanitary areas established in or before 1912 the number of tuberculous

[1] In twenty-five hospitals in 1914 and in twenty-four in 1915 the beds available for the treatment of tuberculosis are not specially allotted, and the available accommodation is therefore somewhat in excess of the figures given above.

patients treated for the first time during 1914 exceeded 70 per cent. of the primary notifications in the areas in the same year. In some places relatively little use has been made of the dispensary service. This appears to be due in some instances to the not altogether satisfactory nature of the arrangements, especially to the fact that but little treatment is given at the dispensaries. The matter, however, requires local inquiry before a definite conclusion can be formulated. The extent to which contacts are examined varies considerably; but, taking the country as a whole, only a small portion of the home contacts are actually examined. In a few county boroughs and in a still smaller number of counties a considerable amount of examination of contacts is carried out. On the other hand, there are a number of areas where little or no attempt has yet been made to secure such examinations. This work is one of the most important functions of a dispensary service, and it should be the aim of every tuberculosis officer to develop it to the fullest possible extent. As to residential institutions for the treatment of pulmonary tuberculosis, the table on p. 91 shows the number of institutions and of beds approved in England (excluding Monmouthshire) in 1914 and 1915 respectively.

In addition to the provision indicated in the preceding table, plans have been approved for new buildings to contain 3,978 additional beds. Approval has also been given for 19 sites upon which it is proposed to erect buildings to accommodate 1,616 additional beds. The accommodation at present available for the treatment of tuberculosis represents one bed for every 3,113 persons (census population); in July, 1914, one bed was available for every 3,804 persons. Several county borough councils (Birmingham, Leicester, Bradford, and Nottingham) have made temporary arrangements to treat poor law cases of tuberculosis, which would usually be treated in their infirmaries, in order to enable the boards of guardians to lend their infirmaries for the treatment of wounded soldiers. The experience thus gained should be of considerable value to the sanitary authorities concerned in determining whether, by agreement with the boards of guardians, they will eventually undertake a complete scheme for the treatment of all cases of tuberculosis, as was contemplated in the course of time in the Board's circular letter of November 7, 1913. A considerable amount of accommodation will ultimately be provided in special tuberculosis pavilions at isolation hospitals for chronic cases requiring short periods of residential treatment, and for advanced cases, as well as for cases requiring special observation. The advantages of this arrangement in certain cases were set out on pp. lxxxi and lxxxii of Dr. Newsholme's report for 1913-14. Special pavilions have been permanently allocated for the treatment of tuberculosis in 21 isolation hospitals, providing accommodation for 460 patients. In nearly all these hospitals a new pavilion has been erected; but at the one or two in which an existing pavilion has been adapted, accommodation for the treatment of acute infectious disease equivalent to the number of beds displaced has been provided. In addition, in 39 isolation hospitals accommodation for 1,290 tuberculous patients has been provided in pavilions intended primarily for acute infectious diseases. This figure represents about 4 per cent. of the total accommodation in isolation hospitals in England. This arrangement of treating tuberculosis in wards intended for acute infectious diseases is usually merely a temporary expedient pending the provision of per-

manent tuberculosis pavilions. In such cases the pavilion is approved subject to the condition that it shall be cleared of tuberculous patients if required for cases of acute infectious disease. Occasionally the fear is expressed that tuberculous patients receiving treatment in a pavilion at an isolation hospital run some risk of contracting an acute infectious disease. The risk is negligible in a properly planned and satisfactorily administered institution. As a matter of fact, no satisfactory evidence of the cross-infection of a tuberculous patient has come to the notice of the Board. Arrangements have been made for the permanent use, in treating tuberculosis during interepidemic periods, of ten small-pox hospitals. These hospitals provide accommodation for 415 tuberculous patients. In these cases satisfactory arrangements have been made under which either a small new hospital has been built or an agreement has been made with the owners of some other small-pox hospital to receive sporadic cases of small-pox occurring in the area served by the hospital taken over for tuberculosis. By this means first cases of small-pox can be dealt with promptly and efficiently, and the tuberculosis arrangements need not be disturbed by the occurrence of a small outbreak of small-pox, but only if a considerable epidemic occurs in the district. Nineteen small-pox hospitals were being used temporarily during the year for the treatment of tuberculosis, and afforded accommodation for 792 patients. In these cases, also, satisfactory provision has been made for the treatment of first cases of small-pox, or arrangements have been made for the prompt removal of tuberculous patients if a case of small-pox occurs in the district. The number of general hospitals approved for the treatment of tuberculosis has risen since July, 1914, from 35 to 48. A considerable number of these hospitals, especially those in London, receive doubtful cases of tuberculosis with a view to a definite diagnosis being obtained. Only a few general hospitals treat cases of pulmonary tuberculosis, except as emergency patients—for instance, for hæmoptysis. Most general hospitals receive patients suffering from non-pulmonary tuberculosis requiring operation or special treatment. Practically no general hospitals are able, on a considerable scale, to treat tuberculous disease of the bones and joints for the prolonged period for which such treatment may be needed; and additional special institutions are needed for this purpose. The number of sanatoria and combined institutions increased from 104 in July, 1914, to 120 in June, 1915, and the number of beds from 5,398 to 6,496. The increase is due to a very considerable extent to the opening of new institutions erected by county and county borough councils. In July, 1914, about 25 per cent. of all the beds available in this group were provided in institutions belonging to local authorities; in June, 1915, this percentage had risen to 32. In a number of cases arrangements had been made to commence building new sanatoria, but owing to the war building has been deferred. In some cases where buildings were partially erected, the work was continued, to avoid the depreciation of unfinished buildings exposed to the weather. Although during the year the number of beds specially allocated to the treatment of tuberculosis in children has increased, there is still great shortage of accommodation; and, as a result, tuberculous children, especially those suffering from pulmonary tuberculosis, who are excluded from school, have frequently been treated in institutions intended primarily for adults. Although this is undesirable, it does not appear reasonable to object until more accommodation becomes available, as otherwise the

patient, in most instances, will receive no institutional treatment. It was intimated in the Board's circular of April 29, 1915, that arrangements had been made under which the Board in future would undertake the investigation of proposals for the treatment of tuberculous children, consulting the Board of Education before approving the plans, with special reference to arrangements required by them for the education of the children. It is important that in the future arrangements should be made for tuberculous children to receive institutional treatment separately from adults. Children suffering from pulmonary tuberculosis or from non-pulmonary tuberculosis not calling for very specialized treatment may be treated at a sanatorium containing adult patients, but in different wards or pavilions. If the number of children in this group is very large, a separate children's sanatorium is desirable, combination of authorities for this purpose being the best plan in most instances to secure this end. For the satisfactory conservative treatment of tuberculosis of bones and joints a separate institution is advisable. Special arrangements are required for the convenient nursing and the efficient treatment of such patients, and the institution needs to be under the supervision of a specially trained medical officer. In the interests of efficiency and economy, it is desirable that the institution should contain not less than 100 beds. If a council requires fewer than this number of beds, it is desirable that several authorities should combine for this purpose. Suitable arrangements must be made for the education of the children in institutions receiving children of school age, excepting those institutions which receive only children suffering from advanced disease and unlikely to recover, or institutions for children requiring special treatment for short periods. One of the conditions laid down by the Board in approving any children's institution is that the requirements of the Board of Education with regard to education must be satisfactorily met. During the past year, the time of the medical inspectors having been occupied chiefly in work arising out of the war, much of the usual work of inspection of tuberculosis work and institutions has been intermitted. The number of complaints as to institutions received by the Board and requiring investigation has been small. The number of persons sent by county and county borough councils to residential institutions during the year 1914 was 19,021; of these, 18,117 were suffering from pulmonary and 904 from non-pulmonary tuberculosis. The following table shows the proportion of patients suffering from all forms of tuberculosis, pulmonary and non-pulmonary tuberculosis, who were sent to residential institutions in England, excluding Monmouth. These are stated per 100 deaths, per 100 primary notifications, and per 100 new cases dealt with by the dispensary in the year under report, respectively:

PROPORTION OF TUBERCULOUS PATIENTS SENT TO RESIDENTIAL INSTITUTIONS IN 1914.

	All Forms of Tuberculosis.	Pulmonary Tuberculosis.	Non-pulmonary Tuberculosis.
Per 100 deaths (1913)	40	51	8
,, primary notifications (1914) ..	20	25	4
,, new cases dealt with by the dispensary during 1914	46	—	—

For non-pulmonary tuberculosis the proportion is given only for the patients treated in connection with county and county borough schemes. Doubtless a large number of patients were also treated as heretofore by voluntary hospitals and other institutions supported by private charity. In addition to the 19,021 patients sent to residential institutions by county and county borough councils, a number of patients were sent independently to institutions by Insurance Committees which had no agreements with local county or county borough councils for the treatment of insured persons. The following table shows the average duration in days of the treatment of each tuberculous patient in residential institutions in England, excluding Monmouth, for which returns were available, during 1914:

	All Forms of Tuberculosis.	Pulmonary Tuberculosis.	Non-pulmonary Tuberculosis.
Counties	78	78	69
County Boroughs	77	77	83
England, excluding Monmouth	78	78	77

PROPORTION OF TOTAL DEATHS FROM PULMONARY TUBERCULOSIS OCCURRING IN RESIDENTIAL INSTITUTIONS.

	Percentage of all Deaths from Pulmonary Tuberculosis which occurred in—											
	Workhouses.	Hospitals, etc.	Asylums.	All Institutions.	Workhouses.	Hospitals, etc.	Asylums.	All Institutions.	Workhouses.	Hospitals, etc.	Asylums.	All Institutions.
	1911.				1912.				1913.			
England and Wales ..	19·9	4·5	4·1	28·5	20·8	5·0	4·0	29·8	19·1	6·8	4·5	30·4
London	39·5	9·5	5·7	54·7	41·2	10·5	4·6	56·3	36·2	13·8	5·6	55·6
County Boroughs ..	25·7	3·9	2·9	32·5	25·1	4·4	3·5	33·0	23·1	6·9	3·8	33·8
Other Urban Districts	11·2	3·5	3·5	18·2	12·3	3·9	3·6	19·8	11·9	4·6	3·9	20·4
Rural Districts ..	4·9	3·0	6·0	13·9	5·9	3·1	5·4	14·4	5·8	3·2	6·1	15·1

The preceding table, prepared from information kindly supplied by the Registrar-General's department, shows a steady increase in the proportion of persons suffering from pulmonary tuberculosis who die in institutions. During the later stages of the disease the infectivity of the patient is generally at its maximum, and the possibilities of adequate nursing in the home are usually small. The removal of the patient to an institution where he can be properly nursed, and where precautions against the spread of infection can be taken, is therefore very desirable in the interest both of the patient and of his family. It is satisfactory to note that an increasing use is being made of treatment in residential institutions. The table shows a considerable increase in the number of patients who have died in "hospitals" (this heading included sanatoria, hospitals, nursing homes, etc.). This is accounted for by the fact that

a steadily increasing number of beds for this class of case become available year by year. We have quoted somewhat at length Dr. Newsholme's valuable report, for it is essential that, if we are to conserve that which has already been secured and prepare for judicious progress in the future, clear views should prevail and accurate information be provided as to existing conditions. Dr. Newsholme's luminous report therefore deserves and demands fullest consideration. The report also contains reference to the results of valuable investigations which have been carried out by Drs. Eastwood and F. Griffith, with the assistance of Dr. Gauvain, in regard to joint and bone tuberculosis.

TUBERCULOSIS SCHEMES.

The Report of the Department Committee on Tuberculosis in connection with the work of the National Health Insurance Commission, and the recommendations therein contained, together with numerous other influences, led to the initiation of many elaborate borough and county schemes for dealing with tuberculosis. War has, unfortunately, curtailed or arrested the organization and administration of most of these schemes. The National Association for the Prevention of Consumption and Other Forms of Tuberculosis have, however, thought fit to publish at this critical time in our national history a "handbook" regarding tuberculosis schemes,[1] the reasons given for such action being that it is intended, "firstly, to serve as an index to the progress of the campaign against tuberculosis in the United Kingdom; secondly, to stimulate responsible authorities and philanthropic agencies to increased effort." It is claimed in the "prefatory note" that this is "the first attempt to collate the facts regarding the tuberculosis schemes which are coming into being throughout the country"; but this is scarcely the case, as between thirty and forty pages, or nearly the same number as compose this brochure, were devoted to signed accounts of the chief tuberculosis schemes then in being, in vol. i. of "The Tuberculosis Year-Book and Sanatoria Annual," published in 1913.[2] The new work is based on returns obtained in reply to a letter sent out to Medical Officers of Health in December, 1914, and followed by a second letter two months later sent to those who had failed to reply to the first. The questions asked were as follows: "1. Does your tuberculosis scheme include—(*a*) Tuberculosis dispensary? one or more? (*b*) Sanatorium? one or more? (*c*) Hospital? Advanced cases, observation cases, surgical tuberculosis. (*d*) Tuberculosis school? (*e*) Farm colony? (*f*) Provision for children? Pulmonary tuberculosis, non-pulmonary tuberculosis. 2. Has the scheme been approved by the Local Government Board? 3. To what extent is it in operation? 4. How is it related to the Public Health Department? 5. How is it related to the Insurance Committee? 6. Is there a Tuberculosis Care Committee? and if so, how constituted?" The returns are arranged in tabular form, and, although not without interest as indicating something of good intentions, cannot now be considered

[1] "Handbook of Tuberculosis Schemes." Issued by the National Association for the Prevention of Consumption and Other Forms of Tuberculosis, 20, Hanover Square, London, W. Pp. v+43. London: Adlard and Son and West Newman, Bartholomew Close, E.C. 1916. Price 1s.

[2] See "Tuberculosis Schemes," pp. 163-198, in "The Tuberculosis Year-Book and Sanatoria Annual," vol. i., 1913-14. Published by Messrs. John Bale, Sons and Danielsson, Ltd., 83-91, Great Titchfield Street, Oxford Street, W. Price 7s. 6d. net.

of much practical value. No names of actual workers are given, and very few definite addresses. When the time comes for the issue of a revised version of this handbook, it is to be hoped that it will contain actual information likely to be of practical service to medical advisers and social workers.

TUBERCULOSIS IN CHILDHOOD.[1]

Ghon's investigations and conclusions have for long been known to pathologists and physicians specially interested in the problems of pulmonary tuberculosis, but Dr. Barty King has accomplished a valuable service in rendering into excellent English Professor Ghon's monograph. It is to be hoped that international prejudices and animosities, or the engrossment of the majority of medical practitioners in military, medical, and other national duties, will not altogether preclude the study of this work, for it is one which is highly suggestive and likely to prove of some practical service. Needless to say, the translation was undertaken and its publication arranged for before the outbreak of war. Dr. Barty King in his preface very rightly says that, "in connection with the study of diseases of the lungs in children, what is wanted is a closer correlation of the work of the clinician, radiographer, and morbid anatomist, in the search for an accurate interpretation of their recorded observations." It is urged that, "in connection with the investigation by the pathologist of cases of thoracic tuberculosis, it should be a fixed rule that, where no macroscopical evidence of a tuberculous focus is found in the lung area corresponding to the lymphatic glands which are found to be tuberculous, such a lung area should be submitted to a careful microscopical examination, to animal experiment, or to both, for the presence or absence of tuberculosis in that pulmonary area." Ghon in his preface refers to Parrot's law, which indicates that in the child, whose organs are immature and considerably better adapted for investigation than those of the adult, no tuberculous affection of the lungs is met with where the adjoining lymphatic glands are not also involved, and, *vice versa*, that no tuberculous changes in the tracheo-bronchial lymphatic glands are found without analogous lesions in the lungs. Parrot looked upon the tracheo-bronchial lymphatic glands as the mirror of the lungs. Exceptions to Parrot's law probably occur, but they are rare. Küss in his well-known work studied with minute care the channels of tuberculous infection in childhood. Ghon quotes at length the chief of Küss's conclusions in regard to that form of tuberculosis in childhood which originates through inhalation: "This form is first characterized by the formation of a small tuberculous focus, usually subpleural in situation. The lymphatic glands adjoining the lung focus nearly always become tuberculous. The lymphatic channels between the primary lung focus and the first adjacent lymphatic gland almost always remain healthy. The primary lung focus is equally frequently situated on the right and left sides, but is most commonly met with in the lower lobes. The apices are rarely

[1] "The Primary Lung Focus of Tuberculosis in Children." By Dr. Anthon Ghon, Professor of Pathological Anatomy at the German University in Prague. English edition. Authorized translation by D. Barty King, M.A., M.D., M.R.C.P., Assistant Physician to the Royal Hospital for Diseases of the Chest, London, etc. Pp. xxiv, with 72 text illustrations, one black and one coloured plate. London: J. and A. Churchill, 7, Great Marlborough Street. 1916. Price 10s. 6d. net.

involved. The primary focus is generally subpleural in situation, but sometimes intraparenchymatous." It is stated that Küss never met with a case where the primary lung focus in a child was not accompanied by tuberculous involvement in the adjacent lymphatic glands. Sometimes the infection appears to be a retrograde one from tuberculous mediastinal foci. H. Albrecht's results are also quoted. His conclusions go to show that the primary infection of the lung in childhood is always of aerogenous origin. The views and observations of Foedisch, Birch-Hirschfeld, Naegeli, Ponfick, Most, Westenhoeffer, and others, are referred to. Ghon's work practically confirms the evidence presented by Küss and Albrecht. The greater part of his able monograph is devoted to a record of the study of individual cases. The whole work merits careful study, and it may be hoped will stimulate many, as occasion offers, to carry out similar lines of investigation in this country.

MANUALS FOR MEDICAL ADVISERS AND WORKS OF REFERENCE.

In these war days the question of food is one of increasing importance. In bygone times superalimentation was considered an essential part in the dietetic and hygienic management of consumptives and other tuberculous cases. Fortunately, we have reached surer ground, but we are still far from the general adoption of an economic and physiological dietary. It would be well if the boards of management of all institutions insisted on a reconsideration of their diet tables. There can be no doubt that real improvements could be made, and in many instances without increased financial expenditure. As a means to a more rational and less extravagant dietary, we would strongly recommend a careful perusal of the informing and practical brochure prepared by Professors T. B. Wood and F. G. Hopkins, of Cambridge.[1] It contains a succinct, non-technical, convincing brief for a readjustment of our food budgets. The uses of food are clearly explained. Tables of food values are given, with indications of the cost as evidenced in various foodstuffs. Particulars are given respecting the customary forms of an ordinary man's diet. And finally there is a constructive section dealing with the preparation of food budgets. This little work is a real contribution to patriotic service, and a copy should be in the hands of every patriot in the land.

The National Insurance Act was a measure built on a peace basis, and war has dealt hardly with its machinery. A time will come for readjustment, but that time is not yet. Meanwhile we must make such use as is possible with the means at hand, and the recently issued Handbook provided for the used of Approved Societies will be found of much practical service to those called upon to administer the National Insurance Acts or advise regarding the same.[2] Particulars are given regarding procedures to secure medical and sanatorium benefits.

[1] "Food Economy in War Time." By T. B. Wood, M.A., Drapers Professor of Agriculture, and F. G. Hopkins, M.A., F.R.C.P., F.R.S., Professor of Biochemistry. Pp. 35. Cambridge: The University Press. 1916. Price 6d. net.

[2] "National Insurance Act: Handbook for the Use of Approved Societies." English edition (provisional issue, revised to August, 1915). Pp. 324. London: Wyman and Sons, Ltd., 29, Bream's Buildings, Fetter Lane, E.C. 1915. Price 1s.

PREPARATIONS AND APPLIANCES.

THE UNIVERSAL VACUUM FLASK.

A VACUUM FLASK has become one of the most serviceable of modern inventions. One of the best forms now available is THE UNIVERSAL VACUUM FLASK.[1] A vacuum bottle is made by exhausting all the air from a space between two bottles, the one inside of the other, which process leaves the inner bottle entirely surrounded by the void or vacuum. The opening is then sealed, and the vacuum is permanently confined unless the bottle is cracked or broken. A vacuum is the best insulator against temperature; heat or cold cannot penetrate it. Therefore, when a liquid is placed in the inner bottle and corked, the approximate original temperature is maintained for long periods, because heat or cold cannot pass through the vacuum. The new form of vacuum vessel may be obtained as a bottle, jar, or carafe, and all represent the highest achievement of the process at prices within reach of everyone. They are unequalled in simplicity, durability, and efficiency. We would draw special attention to the new rubber gasket, or rubber ring which fits round the neck of the bottle where it meets the nickel shoulder. This forms a waterproof joint with the interior glass bottle, absolutely preventing any liquid coming into contact with the interior of the metal case, and preventing also any metal contaminating the liquid which is put into the bottle. The shock absorber, also, is so designed as to form a maximum protection against breakage. Numbers of these flasks are in daily use by our troops both at home and abroad, and by the members of the Navy on the high seas. The flask will be invaluable to doctors, nurses, travellers, and other vagabonds. It will also prove of special service to patients undergoing open-air treatment. For use in sanatoria and for consumptives undergoing hygienic management in their own homes it will be much appreciated.

THE UNIVERSAL VACUUM FLASK.

THE "EMERALITE" LAMP.

Under the designation of THE "EMERALITE" LAMP there has recently been introduced an ideal form of electric lamp.[2] It may be obtained in various forms. One, such as is indicated in the accompanying figure, is well adapted for the table or desk of the doctor in the consulting-room, the hospital ward, or the sanatorium. Another

[1] The various forms of the Universal Vacuum Flask are manufactured by Messrs. Landers, Frary, and Clark, and are supplied by Messrs. William E. Peck and Co., 31, Bartholomew Close, London, E.C. An illustrated price list will be sent on application.

[2] The "Emeralite" lamps are supplied by Messrs. Partridge and Cooper, Ltd., 191-192, Fleet Street, and 1-2, Chancery Lane, London, E.C. An illustrated price list will be sent on application.

form is arranged to stand on the head of a roll-top desk or a piano. For cases in bed a form has been prepared which can be attached to either the round, square, vertical, or horizontal bedposts. These should be appreciated in sanatoria. The "Emeralite" lamp offers many advantages. It is of pleasing appearance, artistic in form, and handsome in

THE "EMERALITE" LAMP.

its finishings in brass or white enamel. It affords a protected and suitably shaded light which is most restful for the eyes. It is strong, durable, easily cleaned, readily removed, quickly fixed in position, and can be used wherever an electric current is available. Moreover, the "Emeralite" lamp is not expensive.

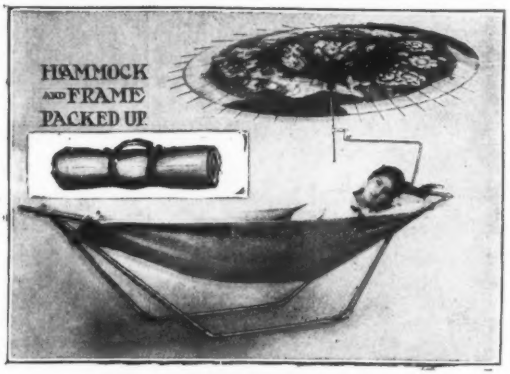
THE STRETCHER HAMMOCK.

Messrs. F. Bastin and Co. some time since introduced a novel and effective "ADJUSTA" PATENT SUNSHADE HOLDER, which we strongly recommended for all followers of open-air methods of life.[1] The same firm has now placed on the market a thoroughly practical form of STRETCHER HAMMOCK.[2] The chief features are indicated in the accompanying illustration. The frame consists of strong metal tubes. These

[1] An illustrated notice of the "Adjusta" Patent Sunshade Holder appeared in the BRITISH JOURNAL OF TUBERCULOSIS for October, 1915, pp. 218 and 219. The price of the Holder is 2s. 6d. and 3s. 6d.

[2] Full particulars regarding the Stretcher Hammock can be obtained from Messrs. F. Bastin and Co., 97, Queen Victoria Street, London, E.C. The prices are as follows: Stretcher Hammock, 35s.; the same with fitting for bracket, 2s. 6d. extra; bracket and "Adjusta" Holder, 4s. 6d. extra; large sunshade, 3s.; complete, 45s.

can be easily detached, so that the hammock and frame can be compressed into a parcel 3 feet by 6 inches, and weighing only 22 pounds: it can be easily carried. This Stretcher Hammock will be invaluable in



THE STRETCHER HAMMOCK.

sanatoria and hospitals, on board hospital ships, in nursing homes, or for patients in their own quarters. For the domiciliary treatment of many tuberculous cases the Stretcher Hammock will be a real boon.

REQUISITES FOR THE SANATORIUM AND THE TUBERCULOSIS PATIENT.

Medicated inhalations often prove of considerable service in the treatment of cases of laryngeal and pulmonary tuberculosis. A suggestive brochure on the use of antiseptic inhalations has been issued by Messrs. C. T. Kingzett and R. C. Woodcock.[1]

THE SANITAS INHALER will be found of practical service in dealing with infectious and other affections of the mucous membrane of the nose, throat, larynx, and lungs. It is of special use in dealing with cases associated with offensive discharges, or where the breath and sputum are malodorous, as is not infrequent in phthisical and other lung cases. The INHALANT employed has as its basis "Sanitas Oil," but it also contains tinctura iodi, spiritus ætheris, and spiritus chloroformi.[2]

"ENZYMOL" is a new and purified preparation of proteolytic enzyme specially suited for external use in dissolving albuminous matter occurring in false fibrous membranes and in diseased and sloughing tissue,

[1] "Some Experiments concerning Antiseptic Inhalations," by C. T. Kingzett, F.I.C., F.C.S., and R. C. Woodcock, F.I.C., F.C.S. London: Ash and Co., Ltd., Southwark, S.E. Medical practitioners may obtain a copy on application to the "Sanitas" Company, Ltd., Locksley Street, Limehouse, London, E.

[2] Full particulars regarding the whole series of "Sanitas" preparations, which will be found admirably suited to the requirements of sanatorium work and the dispensary and domiciliary management of tuberculous cases, may be obtained on application to the "Sanitas" Company, Ltd., Locksley Street, Limehouse, London, E.

blood-coagula, and the like. It is proving of much service in war surgery, and it seems likely to be of value in certain tuberculous cases.[1]

Messrs. Parke, Davis and Co. have introduced a series of valuable therapeutic preparations in elegant pharmaceutical forms which will be found of special service in the management of tuberculous subjects:[2]

Mentholated Bronchial Lozenges possess decided medicinal properties, but are quite palatable. Each lozenge contains: Fluid extract of coltsfoot, $\frac{1}{10}$ minim; oleoresin of cubeb, $\frac{1}{100}$ minim; fluid extract of capsicum, $\frac{1}{100}$ minim; balsam of tolu, $\frac{1}{10}$ grain; oil of anise, $\frac{1}{15}$ minim; powdered extract of glycyrrhiza, 2 grains; and menthol, q.s. When one of these palatable lozenges is allowed to dissolve in the mouth, its non-volatile ingredients exert a sustained demulcent and stimulating effect upon the mucous membrane of the throat, while its volatile principles have a soothing effect on the bronchial passages. Being free from any poisonous, narcotic, or astringent drug, these lozenges are well suited for cases in which administration is necessary over a prolonged period. They are supplied in convenient tin boxes suitable for the pocket.

Petroleum Emulsion with Proposote is a combination of petroleum oil with proposote, which is a chemical compound of creosote (creosote phenylpropionate) insoluble in water and dilute acids. It is best taken directly after meals, when it passes through the stomach without causing irritation. It is decomposed by alkaline fluids, and in the intestine it is split up, creosote being slowly liberated. Proposote affords a suitable means of administering creosote in tuberculosis. Clinical tests show that the unpleasant effects usually produced by creosote do not occur when proposote is administered, even over a long period. Proposote can be supplied in globules (soluble gelatin capsules) containing either 5 or 10 minims (in boxes of 12, 25, or 100 globules), but perhaps the most effective way of prescribing it in tuberculous cases is as the Petroleum Emulsion with Proposote, each drachm of which contains 20 minims of liquid paraffin, $\frac{1}{2}$ minim of proposote, 1 grain of calcium hypophosphite, and $\frac{1}{2}$ grain of sodium hypophosphite. The dose of this emulsion is 1 to 4 fluid drachms after meals. It is supplied in bottles of 8 and 16 fluid ounces.

"Glaseptic" Ampoules of Camphor in Oil are of service in some cases of collapse. Camphor is a diffusible heart stimulant, and its hypodermic administration is increasingly resorted to in cases of collapse, acute fevers, during or after operations. It has been strongly recommended in cases of pulmonary tuberculosis associated with cardiac enfeeblement. For hypodermic use, a sterile solution in oil is required, and the "Glaseptic" Ampoules provide this in a convenient form.

Hematic Hypophosphites is a valuable preparation for building up muscular and bony structure. Hypophosphites are presented in conjunction with the hæmatinic power of an iron salt, and the tonic action of strychnine and quinine. Each fluid ounce contains: Potassium hypophosphite, $1\frac{1}{2}$ grains; iron hypophosphite, $1\frac{1}{4}$ grains; manganese

[1] Specimens of "Enzymol" and full particulars regarding its use will be sent to any medical practitioner on application being made to Messrs. Fairchild Brothers and Foster, Albert Chambers, 64-65, Holborn Viaduct, London, E.C.

[2] Full particulars regarding the above-described preparations may be obtained on application to Messrs. Parke, Davis and Co., 40, Beak Street, Regent Street, London, W.

hypophosphite, 1 grain; calcium hyphosphite, 1 grain; strychnine hypophosphite, $\frac{1}{8}$ grain; quinine hypophosphite, $\frac{7}{16}$ grain. The preparation is extensively prescribed as a tonic and alterative in tuberculosis, especially in the pulmonary form; in neurasthenia; cases of malnutrition; and in convalescence from febrile disorders. It stimulates the appetite, improves the digestion, and promotes an increase in nutrition. The dose is 1 to 2 fluid drachms. The preparation is supplied in bottles of 4, 8, 16, and 80 fluid ounces.

Syrup Cocillana Compound is a tonic expectorant and respiratory stimulant, with disinfectant, sedative, and laxative properties. It has proved very effective in relieving the cough of bronchitis and phthisis. Each fluid drachm contains: Tincture of cocillana, 5 minims; cascarin (P., D. and Co.), 1 grain; tincture euphorbia pilulifera, 15 minims; heroin hydrochloride, $\frac{1}{24}$ grain; syrup of wild lettuce, 15 minims; menthol, $\frac{1}{100}$ grain; compound syrup of squill (U.S.P.), 3 minims. Cocillana is a South American drug which possesses expectorant, tonic, and laxative properties. It appears to increase the fluidity of the sputum, thereby facilitating expectoration, and to be without effect upon the pulse-rate or heart action. In phthisical patients it seems to reduce night sweats, and to improve the appetite. The dose of the syrup is from $\frac{1}{2}$ to 1 fluid drachm, preferably undiluted, to be retained in the pharynx for a few seconds, then swallowed slowly. Syrup Cocillana Compound is supplied in bottles of 4, 8, 16, and 80 fluid ounces.

Messrs. Parke, Davis and Co. have for some time provided an excellent form of Cod-Liver Oil Emulsion with Hypophosphites, and also a Creasoted Cod-Liver Oil Emulsion. They have now introduced an improved form of Egg Emulsion Cod-Liver Oil. It contains 40 per cent. of pure oleum morrhuæ, emulsified with eggs and preserved with brandy. It is supplied in 8 and 16 fluid ounce bottles.

THE OUTLOOK.

TUBERCULOSIS IN EARLY LIFE.

In the *New York Medical Record* of January 8, 1916, there appeared an article on the relation of age to tuberculous infection, representing an address delivered last September before the joint meeting of the American Public Health Association and the Annual Conference of Health Officers of the State of New York, at Albany, by Dr. S. Adolphus Knopf, Professor of Medicine, Department of Phthisiotherapy, of the New York Post-Graduate Medical School. It is entitled "The Period of Life at which Infection from Tuberculosis occurs Most Frequently. How may we diminish the Frequency of those Infections and prevent them from becoming Tuberculous Disease?" Dr. Knopf had written sixty letters of inquiry to well-known internists, specialists in tuberculosis and pediatrics, including Sir William Osler, the Regius Professor of Oxford. From statistics and impressions gathered from the replies to these letters, and from the perusal of the latest literature on the subject, as well as from the results of his own experience, the following conclusions are formulated: Tuberculous disease in childhood, compared with tuberculous infection, is relatively rare (36 per cent.); on the other hand, tuberculous infection is exceedingly frequent, generally speaking. According to exact statistics, as well as general impressions given by men of vast experience, the majority of cases of tuberculosis in the adult had their origin in an infection during infancy or childhood.

The frequency of infection increases with the age of the child, and, of course, is also affected by the environments the child comes from:

Age.	Lowest Percentage.	Highest Percentage.
Under 1 year	1	9
From 1st to 3rd year ..	9	50
,, 3rd to 5th ,, ...	27	75
,, 6th to 10th ,, ...	34	75
,, 11th to 15th ,, ...	(private) 12	(hospital cases) 94

As to what organs are primarily most frequently involved, statistics and impressions both give lungs and lymph nodules. Prenatal infection, while considered rare, is perhaps much more frequent than statistics show. The age at which a tuberculous infection, contracted in infancy or childhood, becomes active is most frequently at or shortly after 15 years; next between 18 and 30 years. The ages at which tuberculosis was diagnosed, and apparently contracted most frequently in later life, were given as between 20 and 35 years. Nearly all the authorities consulted unite in the opinion that in order to combat tuberculosis successfully in the young and old alike, we must diminish the sources of infection in childhood. (1) To accomplish this end we must seek to amend the federal and state laws which make it a criminal

offence for a duly licensed physician in good standing to give advice concerning the means of preventing conception. We must be allowed fearlessly and openly to instruct tuberculous parents how not to procreate a tuberculous race. (2) All cases of open tuberculosis, particularly the pulmonary and laryngeal types, should be required by law to be reported to the health authorities, who in turn should be authorized to send the patient directly, or through the attending physician, carefully worked out instructions to prevent infecting others. (3) Cases which cannot be properly taken care of in the home, or when it is evident that they constitute centres of infection, should be transferred to sanatoria, special hospitals, or, at least, to special wards in general hospitals. Every community should have sufficient facilities to take care of such cases. The Board of Health of every community should have police power in order to be able to isolate such cases which wilfully disseminate bacilli by indiscriminate expectoration or by other unclean habits, thereby exposing other members of the family, particularly children, to contracting the disease. (4) For the pregnant tuberculous woman there should be a maternity sanatorium or a special ward in existing maternities, where prolonged antituberculosis treatment can be effectually carried out, and where mothers can receive such instructions as will guard their offspring from postnatal infection. (5) Where there is the slightest suspicion of tuberculous infection of the infant by the mother, the child should have a healthy wet-nurse or should be bottle-fed. The preparation of the milk and bottles, tasting the milk to judge of its sweetness and temperature, etc., should not be attended to by a tuberculous mother, but by an intelligent and conscientious healthy person, unless the mother is scrupulously clean and knows how to take every proper precaution against infection. For infants whose mothers, for one reason or another, are unable or not intelligent enough to care properly for their tuberculous offspring, special preventoria should be established. (6) Medically supervised country homes, enterprises similar to the one inaugurated in Paris, for poor tuberculous mothers and their children, where they may remain until they can safely return to city environments, should be provided by private philanthropy, or, better yet, by the aid of the municipality. (7) All children under 5 years of age, be they of poor or rich parentage, should be subjected annually, or even semi-annually, to the Von Pirquet test, and those who react positively, and have, in addition, symptoms and physical signs, should be placed under proper treatment at home, in preventoria, or sanatoria. (8) All children between 5 and 15 years of age, particularly those attending public schools, should be subjected to a careful physical examination on entering as a pupil, and an annual re-examination thereafter, always accompanied by a Von Pirquet test. Those reacting positively and showing physical signs, those evidently strongly predisposed to tuberculosis, anæmic, highly nervous, or afflicted with cardiac diseases, should, according to their condition, be placed in open-air classes, open-air schools, preventoria, seaside or inland sanatoria. This will probably mean that open-air schools must become the rule and the indoor class the exception, which, indeed, would be a great blessing. All physical defects, such as adenoids, enlarged tonsils, deviated septi, must be removed, so that the child's upper respiratory tract may be as nearly perfect as possible. Defective hearing and eyesight, as well as bad teeth, must, of course, also receive

proper attention. (9) Open-air instruction should be practised whenever feasible. Singing, recitation, geology, botany, etc., should be taught out of doors. Calisthenics, breathing exercises, and swimming lessons, should constitute a part of the curriculum of every public and private school. No public school should be without its swimming-pool. A drill in swimming, so as to know how to save one's own, or perhaps other lives, should be as essential as fire drills in public schools. Wherever shower-baths and swimming-tanks (the former to be used prior to entering the latter) form a part of the public school equipment, pedagogues have observed a better morale and better work done by the pupils. The curriculum of our schools should be arranged so that the mental and intellectual training is not carried to the extent of becoming detrimental to the physical development and well-being of the children. (10) The school authorities should have the right to investigate the home of any child attending public school when the teacher or school physician thinks that underfeeding, bad sanitary home environments, or child labour at home, are responsible for a poor physical condition of the pupil, which might develop into tuberculosis. (11) Child labour in factories, mines, canneries, stores, workshops, in the street or at home, must be done away with if we wish to raise a non-tuberculous race. Up to the age of 14, every boy and girl should have the right and privilege to play, and not be forced to work. When arriving at the age of puberty, the boy or girl should be in the best possible physical condition, or else there is a great likelihood that a latent tuberculosis or inherited predisposition will develop into tuberculous disease. Playgrounds and parks should be in abundance in every civilized community. The roofs of schools and tenements should be converted into roof-gardens when the ground is scarce and expensive, as, for example, in New York City. (12) There should be an obligatory examination for tuberculosis and other serious diseases of every boy and girl prior to entering college, the store, the workshop, the office, mine, factory, or any occupation for his or her career in life. The physical and mental test at such a time should be used as a guide in the choice of trade or profession. (13) There should be periodical examinations for tuberculosis of all employes in whatever sphere of activity—in office, factory, workshop, hotels, household, schools, municipal or federal departments, etc. (14) For those weeded out as tuberculous or afflicted with other diseases which incapacitate them for their usual work under ordinary conditions, there should be agricultural and industrial colonies where these semi-invalids nevertheless have an opportunity to earn a livelihood. There also the graduates from sanatoria should be sent for an opportunity to regain strength and vigour to make their cure more lasting, and, above all, learn again to earn their living. (15) There should be state insurance and obligatory private insurance against accident, old age, and diseases, including tuberculosis, for all earning less than $1,000 per annum, so that those fearing temporary or total loss of earning capacity will not be afraid to seek proper treatment in tuberculosis institutions. (16) Although the investigations, the replies from eminent authorities, and the literature consulted, seemed to show that the bovine type of the bacillus of tuberculosis at a maximum estimation is not responsible for more than 10 per cent. of tuberculosis in childhood, we must not allow ourselves to lessen our efforts to combat the disease in animals. We should not have individual and widely

differing state laws, but, instead, uniform bovine laws enforced by federal authorities in all states of the Union alike. Only thus will we be able to combat the source of infection for human beings which comes from the bovine race. (17) With all this there must be a continued propaganda for the education of the masses concerning the prevention of tuberculosis, alcoholism, and other social diseases; for the improvement of housing conditions, boarding-houses, factories, workshops, stores, offices, asylums, prisons, and reformatories; for the prevention of injurious overwork; for healthful recreation of the masses in city and country; for the return to the soil from our overcrowded cities; and, above all, for a living wage for all who labour honestly and efficiently, and a rational and speedy solution of the problem of unemployment. Dr. Knopf says that in spite of all our efforts we are still losing 200,000 people annually in the United States from tuberculosis. As a result of this loss of life and earning capacity of adults and the maintenance and support of the children and the consumptive poor, $900,000,000 are annually spent for this preventable and curable disease. To carry out even the elaborate programme just outlined will not cost $900,000,000 a year. If at first it should even approach this vast sum, within a very few years the expenditure as well as the morbidity and mortality from tuberculosis would be reduced to a minimum. Dr. Knopf says that while he is willing to grant that an early and benign infection may be an immunizing factor, it is well known that this immunization is neither universal, permanent, nor complete; hence we must spare no efforts to diminish all sources of infection. He recommends the establishment of a Federal Tuberculosis Commission to help carry out such or a similar programme to the one he suggests.

THE CARE OF ADVANCED CONSUMPTIVES.

Sir Thomas Clifford Allbutt, the Regius Professor of Physic in the University of Cambridge, in his contribution to the Symposium on "The War and the Future of the Tuberculosis Movement," which appeared in the last number of this Journal, expressed the opinion that we should concentrate our efforts on the care and control of advanced subjects of tuberculous diseases. He urged that "accommodation for advanced cases ought not to be expensive if provided, not by costly buildings and departmental machinery, but by relatively inexpensive and homely arrangements by local authorities." We believe there should be but little difficulty in following out this suggestion The Editor of this Journal some eight years ago, when acting as Special Commissioner for the *Lancet*, visited Norway in order to report on the means and measures then being employed by the far-seeing, thrifty, and scientifically minded Norwegians in dealing with their tuberculous subjects. The full report can be studied in "Scandinavian Winter Health Resorts."[1] It is permissible here to reproduce the section explaining the Norwegian method for securing the care and control of advanced consumptive patients in country nursing homes: "The Norwegian Women's Sanitary Association, which was originally formed to provide for the injured in time of war, and recently has done

[1] "Scandinavian Winter Health Resorts," by T. N. Kelynack, M.D. London: The St. Catherine Press, Ltd., 8, York Buildings, Adelphi, W.C. 1910. Price 1s. net.

much to relieve the hard lot of the fisher-folk, has now taken up anti-tuberculosis work, and such practical assistance promises to be invaluable. The judicious service of this organization has in chief measure led to the establishment of 'pleiehjems,' on the introduction of which Norway may be congratulated. A 'pleiehjem' is a nursing-home for advanced consumptive cases. These have been established in various districts of Norway, and seem to meet admirably, and at comparatively small cost, the needs of a sparsely populated and far-extending country with limited means of communication. 'Pleiehjems' have now been established by eight or ten communes and by some five amts. In Christiania and Bergen special wards are provided for consumptives in the State hospitals. The nursing-homes for consumptives have proved a great boon to the country. They are usually small and homely, with, as a rule, only from six to ten beds. A trained nurse acts as superintendent, and the medical man of the district serves as medical attendant. The initial cost averages about £50 a bed, and the expense of maintenance is comparatively small. These homes were primarily intended for the nursing of 'open' and advanced cases of pulmonary tuberculosis likely to be dangerous sources of infection. About three hundred beds are now available in these institutions. The 'pleiehjem' is certainly a Norwegian institution which might well be adopted by other countries, and for certain parts of the British Isles and its colonies should be very suitable. If, instead of burying funds in stone and marble and other needless extravagances, some such country homes could be established in this land for cases which the ordinary sanatorium cannot or will not take, a great step would have been taken towards the arrest of tuberculosis among our people. Norwegian physicians and statesmen, through their experience with leprosy—a disease in many ways akin to tuberculosis—are peculiarly well fitted to approach the practical conduct of the antituberculosis movement without undue pessimism and devoid of extravagant and irrational hopes. Their reasonable legislative measures, rational philanthropic endeavours, and practical methods in dealing with tuberculosis, all merit high praise, and are worthy of serious study." Some such method as that of the "pleiehjem" might well be given a trial in this country. Considerable numbers of tuberculous soldiers are being discharged from military hospitals, and it is probable that among workers engaged in strenuous war service not a few will succumb to the severe stress and strain to which they are now being exposed. It is certain that existing special hospitals and sanatoria will not be able to deal with many of the advanced and "open" cases of tuberculous disease. For hopeless and infective consumptive cases to be allowed to return to their own homes is but to increase the dangers and difficulties of the situation. A bold policy is required. We would strongly advise the establishment of country centres on the Norwegian system. In some parts of the country suitable houses would in all probability be given or loaned for the purpose, and a suitable Nursing Sister-in-Charge should not be difficult to find for each establishment. The local doctor would, doubtless, act as Visiting Medical Officer, and arrangements could be made for the periodic visits of an expert. We shall be glad to hear from Medical Officers of Health, Tuberculosis Officers, and others, as to the feasibility of this suggestion.

TUBERCULOSIS AND THE WAR.

The *Lancet* for January 12, 1916, contained the following suggestive article based on the symposium which appeared in our last issue:

"The war has necessarily cramped all medical activities apart from matters directly connected with the war. This restriction has applied especially to the measures for dealing with tuberculosis, and was perhaps inevitable in view of the fact that these measures are largely of recent date and their practical working out is still in a somewhat tentative stage. Granting that some restriction cannot be avoided, it is of fundamental importance to limit it to the less important fields of work. A symposium in the current number of the BRITISH JOURNAL OF TUBERCULOSIS is devoted to the question of the effect of the war on the future of the tuberculosis movement. Regarding the matter from widely different points of view, the writers are nearly unanimous on two main points. In the first place, preventive work must at all costs be continued, and consumptive patients who are distributing infection far and wide must be controlled. And, secondly, early curable cases in the young adult and in children must be adequately dealt with. The first point is vastly more important for the welfare of the race than all others, and is one on which all the great pioneers of tuberculosis work have never failed to lay stress. The removal of centres of infection is neither difficult nor costly. Sir Clifford Allbutt truly points out that the accommodation for advanced cases ought not to be expensive, and that 'by homely quarters, kindly and instructed guardians, and very moderate demands upon skilled attendants, the evils of promiscuous herding of the advanced cases in crowded and often not very cleanly houses could be prevented, and those patients placed in comfort for themselves and in safety for their fellows. Such modest efforts even a state of war should not forbid.' The second point concerns the welfare of the individual. Sanatorium treatment must be provided for all those young adults in whom it is probable that a stay of a few weeks will turn the scale towards a recovery of health. As soon as possible the early cases should be drafted from sanatoriums to industrial colonies where they can engage in remunerative occupation. As regards children, Dr. Jane Walker urges that 'every effort ought to be made to save all the children from babyhood upwards,' and states with justice that it would be a real economy to provide residential sanatorium schools for tuberculous children. Open-air schools should be made full use of, and school clinics continued at full efficiency. These two lines of activity are essential, and cannot be restricted in any way without serious menace to the public health at the moment and the future fitness of the community. On the other hand, it may be necessary to restrict institutional treatment for chronic cases of phthisis. Although much can still be done in such cases, yet the results obtained are not necessarily proportionate to the amount of trouble expended, and there may be neither sufficient means nor sufficient skilled supervision in the near future adequately to deal with them in institutions. In its place there must be further development of the system of home treatment under the supervision of nurses and health visitors who have had special experience in such work. This work must include the provision of separate rooms where necessary, at all events of separate beds for patients who spit, attention to cleanliness, the provision of spittoons,

and all the small details on which the health of the patient and the safety of his family turn. In all this the 'tuberculosis nurse' can perform immensely useful service. By thus relieving the pressure on the sanatorium beds, accommodation will be available for the acute cases of tuberculosis in soldiers who return from the field. Much has been said of the probability of a large incidence of tuberculosis amongst those who are exposed to the rigours of the winter climate at the various seats of warfare. It appears that so far these expectations have not been realized, and it may well be that the healthy outdoor life, with abundant food and exercise in the fresh air, may be more than sufficient to counteract the bad effect of occasional physical overstrain. We know that a large proportion of industrial workers who return from the sanatorium to their previous occupation soon break down at it. Heretofore this has been attributed largely to the physical strain of the work itself. The war may be teaching us that relapse is far more dependent than we had realized on the indoor life of the home and the factory. A salutary result of campaigning may be the accustoming of the industrial population of this country to a habit of open-air life which may be a permanent health asset in the future."

NOTES AND RECORDS.

Dr. J. E. Robinson, County Medical Officer, and Dr. Rory McLaren, Clinical Tuberculosis Officer for Dorset, have prepared a valuable report on Tuberculosis in that county.[1]

Dr. S. Adolphus Knopf has issued in convenient reprint form his valuable study of Tuberculosis in educational institutions.[2] Students of Tuberculosis in young subjects may be referred to other of Dr. Knopf's articles.[3]

Dr. H. De Carle Woodcock has issued in reprint form his valuable warnings regarding artificial pneumothorax in tuberculous cases.[4]

An interesting study of subnormal temperature in tuberculous subjects has been written by Dr. Arthur K. Stone.[5]

The Oxfordshire Association for the Prevention of Tuberculosis has just issued a record of well-planned work successfully carried out.[6]

Dr. John Knott has provided an excellent translation of Landouzy's article on the Cinquantenary of Villemin's classic experiments.[7]

[1] Dorset County Council: Annual Report of the County Medical Officer on Tuberculosis for the year 1914, with which is included the Report of the Clinical Tuberculosis Officer.

[2] "Tuberculosis and Other Diseases in Schools and Colleges," by S. Adolphus Knopf, M.D. Reprinted from *The New York Medical Journal*.

[3] See Dr. Knopf's studies on "The Physical, Mental and Moral Vigor of Our School Children" and "Discarded Battleships to be Used as Sanatoria and Open-air Schools."

[4] "The Dangers of Artificial Pneumothorax," by H. De Carle Woodcock, M.D., M.R.C.P.Eng. Reprint from *Edinburgh Medical Journal*, November, 1915.

[5] "Subnormal Temperature in Tuberculosis," by Arthur K. Stone, M.D. *Medical Press and Circular*, February 9, 1916.

[6] "Annual Report of the Oxfordshire Branch of the National Association for the Prevention of Tuberculosis for 1915." Oxford: The Holywell Press, Ltd. 1916.

[7] "The Cinquantenary of the Experimental Demonstration at the Académie de Médecine, by A. Villemin, of the Specific and Contagious Virulence of Tuberculosis, by L. Landouzy." Translated from *La Presse Médicale*, December 9, 1915, by John Knott, A.M., M.D., *The Dublin Journal of Medical Science*, March, 1916.